

Vol 4 No 11

The Australian

Christmas Issue \$3*

COMMODORE and AMIGA REVIEW

Sprites in the Border
a whole new area on the C64



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Bobble

*Boulder-
dash II*

Arena

Pi R 2

*and lots
more*

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The Australian Commodore and Amiga Review

Vol 4 No 1 November 1987

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Editorial



THIS MONTH is a bumper programming issue. That should give you all plenty to do whilst you're on holidays. Our front cover shot is an example of something highly unusual. Sprites in the Border. And not just the bottom or top border, but all four. In fact, the picture is made up of 112 expanded sprites. Such a feat is quite amazing.

Technically, the mere idea is impossible. But, in the U.K and Europe, where it mainly snows, there's time enough to discover such undocumented features. In this month's ACR we explain how to get sprites in your border, and

include a program to do just that, complete with scrolling message.

There is very much more that can be done with this new found ability. It seems that the C64 is finally breaking some new ground after a period of relative software stability. Will these new ideas be used in practical applications?

Last month we published one. A clock in the border. There's bound to be others, so why not take a look at what's possible? Perhaps menus for disks, or even an equivalent to GEOS there in the border, waiting to pop down over your current application.

This latest finding has run hand in hand with huge leaps in the quality of music on the C64. For a real taste of some of the best scores around, be sure to grab yourself a copy of Disk Magazine Seven, or Nine.

In coming months we'll be putting our C64's through their paces more than ever before. Stay tuned as we discover what remains in its amazing abilities. □

Andrew Farrell

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Ram Rumblings

Midi Master

THE MIDI Master package is designed to turn the C64 into a professional quality computerised music system, capable of driving up to 16 synthesizers and drum machines. Included is a standard (European) MIDI interface, sequencing software and manual. Also available is an optional tape sync interface cable that plugs into the user port. This allows the sequencer to be synchronised to a multitrack tape recorder.

The package was written in Sydney by Enmore Music and has been available for the last four months. An agreement was recently reached with Micro Accessories of South Australia to manufacture and distribute the package throughout Australia.

The software has been designed to provide a convenient mix of both real time recording and step time composing while giving as much control over connected synthesizers as possible. Rather than display music notation on screen and then attempt to add to this the various MIDI parameters, it was decided to use a more straightforward system of functions and sequence steps. This system has the advantage that each music parameter is displayed and accessed in a consistent format. An added advantage is that users need no prior knowledge of music notation to use the software. To conserve memory and make composing and arrangement easier a three level structure of song, sections and bars was adopted. This is similar to the memory usage found in drum machines. The graphics option was added to allow home users to generate music videos with the minimum of equipment, namely a VCR.

The package has generated two first prizes at Australian Video Festivals. Paddy Brennan won the Student Music Video in 1986 with a piece called *Bobs Apple Pie*. Enmore Music Corporation won first equal this year in the computer graphics

section with a piece called *You can't lose*.

The software can be customised to suit any MIDI interface. This option could be used by owners of Steinberg and Passport interfaces to upgrade to tape sync and graphics.

Readers' enquiries should be directed to Micro Accessories of S.A., Unit 8 Hewittson Road, Elizabeth West, S.A. (08) 287 0191.

Prices are expected to be around \$130 retail, less than half the cost of any other C64 package. Prices on the tape sync have not been finalised but will be less than \$70.

If you need any more information about the package please call Jon Salmon at Enmore Music on (02) 513 922 both business and after hours.

Exhibitions

EXHIBITION ORGANISER, Australian Exhibition Services Pty Ltd, will be staging the first major trade show in Australia's new Sydney Exhibition Centre, in February next year.

PC88, Office Technology 88 and Communications 88, Australia's largest technology event, is expected to attract bigger crowds than ever before when it opens on 7 February, 1988. The exhibition runs for four days, from Sunday to Wednesday.

Major companies have booked space for next year's event. While the same amount of space is being offered, AES expects it will only be able to fit 160 exhibitors into the two halls, as major companies such as IBM, Epson, Mitsubishi Electric AWA, Imagineering, Commodore, Sharp, Roneo Alcatel, Harris Lanier, and Telecom have taken larger stands than in previous shows.

Communications 88 will focus on business communications, and in particular the two main areas of data communications and telecommunications.

Update



I HAVE just come back from the COMDEX Exhibition in Las Vegas where the only thing that surprised me was that they had not put a poker machine in my bedroom.

The show itself was very impressive if you were looking for hardware, networking, machines with multi gigabytes, but there really was a dearth of new software or peripherals. However, I was able to come to an arrangement with some suppliers over there and am waiting for samples of the following products:

1. Sesame Street Educational software.
 2. A training kit for IBM compatibles.
 3. A new Disk Drive for the C64.
 4. A great new Joystick for the C64 and IBM compatibles.
 5. Two new programs for the Amiga.
 6. External Disk Drive for the Amiga.
- and sundry other items which I am not 100% sure will come.

As usual, none of the above will be marketed until they have been thoroughly tested by our own technical people here, but once we get stock I can promise you, you will be the first to know.

It appears that thousands of Commodore family packs are being sold at the moment, and as you are aware, they only come with cartridges, and the truth is that there is very little available on cartridge, so most buyers of this pack will very quickly want to get hold of a cassette drive. Therefore, Pactronics are releasing their new modified, 100% alignment cassette drive, which will be available only through Grace Bros. from the 1st December, but will later be available from all Commodore computer retailers.

Any of you who have purchased our products in the past will know that on our guarantees we suggest that you return a portion to us so that we can keep you informed of new products. Also, on the back of our brochures we suggest that you send your name and address to our "Up-Date" club. We were very flattered to hear that that colossus of the software industry in Australia - Imagineering - had decided to follow our lead and also to set up an "up-date" system. (We apologise in advance if they had already had the idea before seeing ours).

Talking about brochures and up-dates, why not send us your name and address, quoting which machine you own, to our "Up-Date" Club, P.O. Box 187, Willoughby, 2068, and we will send you out our current brochure and up-date information.

Once again, let me recommend you to look for Pactronics logo on software, Joysticks, Disk Boxes etc. to make sure you get best value and best service.

P.S. Our new hot-line number is 407 0263 ☐

B.B.F.N.

Office Technology 88 is, in a word, everything. Everything that has anything to do with the office technology industry from furniture to facsimile systems can be found at this wide ranging exhibition.

International exhibitors in Sydney will include groups from the UK, Singapore, Taiwan and companies from Hong Kong and West Germany.

For further information on the exhibitions, please contact Janelle Schreiber, Phone: (03) 267 4500.

Questor Entertainment

WITH THE increasing popularity of entertainment software Imagineering have launched a new subsidiary of the company called Questor Entertainment Products.

Newly appointed National Sales Manager Alan Bowman said, "We recognise there is a need to create high profile consumer marketing. The launch of "Questor" allows us to achieve a dedicated entertainment software range, supported by highly visible advertising and strong merchandising materials.

"For the first time "Questor" will launch its challenge to computer owners through the medium of television with commercials scheduled to begin in early October and running through to the end of January.

"With an initial investment of \$500,000 on a major TV and promotional campaign "Questor" will lead the field in driving the "hottest" titles through the dealer and major retail channels making the customers' choice simpler and more obvious," he said.

Here is just a taste of what's available from software publishers.

Activision

Supersprint: A blockbuster - original, best selling arcade game from Atari. It includes one or two players - head to head racing - eight different tracks - jump ramps - opening and closing gates - hidden short cuts - over and under passes and banked corners - *Supersprint* is a high class racing game.

Guadalcanal: War strategy game in which you refight the battle of Guadalcanal.

Xis: Arcade style flight mission utiliz-

ing state of the art graphics. You are at the control of NASA's legendary X-15 superplane and you must seek and destroy a terrorist space station that is threatening American cities.

Other top games are *Ram-page* - *Hang On* and *Fire Trap*.

Wonderboy was featured recently in the new Daily Mirror Newspaper entertainment computer section - "Smooth scrolling landscape, fast action and plenty of chances for bonus points make this game a real eye catcher."

Micro Illusions

- Exclusive from Imagineering.

Fire Power: Head to head tank battle game.

Black Jack Academy: An excellent start for those of you on your way to hit the gambling tables.

Romantic Encounter: Experience the single life in this exciting lifelike text simulation of a night on the town at the famous dome nightclub.

Land of Legends: Combining the best of all dungeon type adventures.

Microprose

- Exclusive to Imagineering.

Great new range of products from Imagineering.

Gunship (disks and cassettes C64): The best helicopter flight simulator on the market. Simulation of the AH-64 Apache, one of the most advanced warrior helicopters in the world.

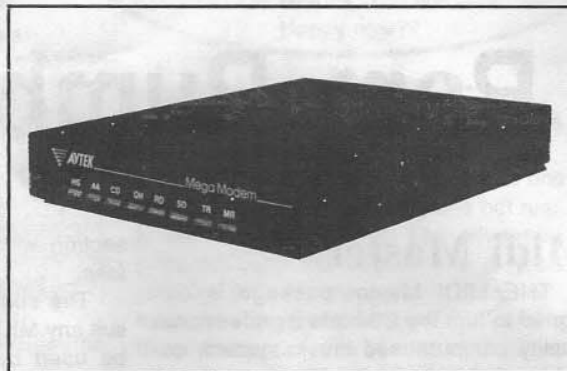
Mindscape

King of Chicago: a brilliantly devised game that far outstrips others of its generation."

Avtek Mega Modem

AVTEK, ONE of Australia's longest established modem manufacturers' has just launched a new range of smartmodem products.

Totally designed and built in Australia, the new Megamodems are compact, fully Hayes compatible and available in either V21/V22 or V21/22/23 configurations. An internal "in-modem" is also



available as a half card unit, suitable for IBM PCs and compatibles.

Unlike competing modems, the Megamodems are upward compatible. They also carry a 12 month extended warranty and access to Avtek's technical support line. Priced at just \$375 and \$449 including tax both "Megs" are priced well under equivalent products, local or imported.

A recent equity injection by an offshore investor has allowed Avtek to significantly increase its R&D and to expand its operations to take advantage of the growing communications market.

Mr. Phil Gleeson, Managing Director, was quoted as saying, "we are now in a position to offer locally designed and manufactured products with on-going R&D commitments and with direct end user support at a price not only competitive with local modems but lower than "cheap" Asian imports. Why buy imported and unsupported products, when you can buy a superior local modem at a better price?" he said.

For further information contact: Clare Gallagher or Phil Gleeson, Avtek Electronics Pty Ltd,

(02) 712 3733

Warning! Software warranties misleading

MANY SOFTWARE warranty disclaimers are misleading and probably illegal under the Trade Practices Act, says National Prices Network head, George Gear.

Computer users should not be deterred from taking action over faulty soft-

ware by warranty statements which claim the risk and liability all lies with the buyers.

Mr. Gear said the Trade Practices Commission has confirmed that such disclaimers are illegal because they mislead consumers about their rights.

"If software claims in its advertising, packaging or manual to be able to do certain functions which it cannot adequately perform, then the consumer has grounds for legal action against the retailer or supplier.

"Buyers of software who are dissatisfied with their product have the right to complain.

"Disclaimers such as

"... makes no warranties, either express or implied, with respect to the program ... its quality, performance, merchantability, or fitness for any particular purpose. This program is sold 'as is'. The entire risk as to its quality and performance is with the buyer"

do not take away a consumer's rights under the Trade Practices Act."

These rights could include full refund of purchase price and in some instances even consequential damages.

"The Act upholds the principle that a product should be fit and suitable for the purpose for which it was intended to be used.

"In the Commission's view, any exclusion clause which attempts to restrict the scope of the Act and deny consumer rights is not only void but may also be in breach of the Act which prohibits false or misleading representations concerning the existence of any condition, warranty, right or remedy.

"Disclaimers are common practice in the industry and are used by major software companies," Mr. Gear explained.

"Most commonly used software in Australia is made and packaged in America.

"The disclaimers may be alright under

American law, but in Australia the Trade Practices Act overrides all others, and computer software is subject to the same warranty conditions as other products.

"People selling overseas software should be aware that they may be breaking federal laws unless they include in their software packages a prominent statement which negates the disclaimer."

Mr Gear said the Commission is mounting an information campaign aimed at securing industry compliance with Australian law.

It expects the companies in the industry will co-operate in the interest of consumers and maintaining their own good reputation.

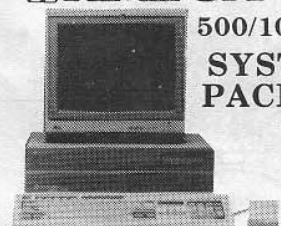
Though the Commission hopes to avoid the need for litigation it will closely monitor the industry's response. □

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* NEW RELEASES *

Firepower, Land of Legends, Plutos, Gold Runner, Galactic Invasion, Hardball, Mean 18 Vol II, Desktop Artist, Animator Junior, Visawrite, Haicalc, Enigma, A500/2000 Tech. Manual, Amiga World November



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LETTERS

TO THE EDITOR

Help Adventurer

O.K. you guys! You sit there squawking about "Keep those hints coming for Adventurers Realm . . ." and when someone, like myself, goes to the trouble of sending them in, complete with a map, it doesn't even rate a mention!!! And what's more I notice that Adventurer's Realm is becoming smaller and smaller. What is happening at ACR?

I am sure there are a lot of people such as myself out there in Commodore land who look forward to ACR for the hints to help them along a little farther in their quests. None of my friends are "Camp" buffs and my nearest user's group is too far away for me to attend. Into the bargain, I work full time and am over twenty-five (bloody pitiful state of affairs, isn't it !!?)

(Incidentally, my letter was for *The Neverending Story* which I bought and solved well over eighteen months ago!!)

I would be grateful overwhelmed, thankful, (frustrated if you like it) if you do!

I would also like to contact any over 25 Adventurers to adventure

with (Computer Adventurers, silly!) and would appreciate it very much if someone out there could send me a copy of the instructions for *Theatre Europe*, *Strike Eagle* and *Dambusters* as my over zealous 14 week old Rhodesian Ridgeback puppy did a munch on them and digested them without any apparent side effects.

Luckily the games escaped with a mass slobbering and still work. Unfortunately I had only purchased them a couple of hours beforehand and haven't a clue what I am supposed to be doing !! (Situation normal).

Thanking you muchly (publish this or look out - no! it's a threat not a promise!)

Sonja Taylor
Wavell Heights, QLD

Ed- *Sonja, the only person over 25 in this office is the cleaner! But really, don't you think it sounds rather like your pet dog is a pirate's friend? Well, we'll give you the benefit of the doubt.*

Resets

I have recently bought your

magazine and I can say just one thing - fantastic!

Here in Sebastopol (near Ballarat) there is a growing C64 following and most of my friends buy your magazine. Most of us have installed reset switches via the user port, and there is one problem - how do we call back programs when you have reset it?

My friend has hit upon a few random SYS numbers which occasionally worked, but not on all software. Also is there any way of listing out the program? There is a lot of mystery concerning this and the help of experts would help a lot.

If you can't publish the information or if you can't figure it out write to me using the above address.

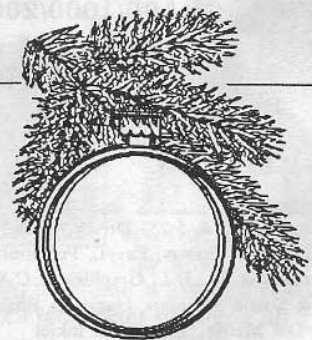
Graeme Stables
Sebastopol, Vic.

Ed- *Try the program below. Enter it. Save it, then RUN. SYS 49152 will return your program after a RESET.*

ready.

```
1 rem old.. basic loader
2 rem
3 rem by andrew farrell
4 rem
5 rem program sits at $c000..(49152)
6 rem
10 s=49152:
20 data 169 ,1,141,2,8,32,51,165,24,165,34,105,2,133,45,165,35,105,0,133,47,96
30 reada:ifa=999then50
40 pokes,a:s=s+1:q=q+a:goto30
50 ifq<>1658thenprint"data error":stop
60 data 999
```

ready.



Sprites in the Border

Just when you thought there wasn't one thing left to play with on your Commodore 64, a whole new area has opened up. Andrew Farrell explains.

FOR SEVERAL months now, programs have been pouring out of Europe and the U.K. with the most fantastic graphics and music yet. The U.S. is only now just beginning to realise what has been produced. In Australia, we have enjoyed a flow of these programs.

Our own Disk Magazine Issue Six contained examples of these programs, and plenty more are promised. However something special stands out in these programs that makes them especially worthy of further investigation. On many a special technique is being used to place sprites outside the usual border.

The border we're talking about is the one that normally appears around the text or graphics screen. Yes, sprites can be positioned there, but there is no way of making them visible.

These programs have found a way. It's not official. Technically it must be the result of a design fault in the Video Interface Chip. From a software point of view, there is no sure fire explanation of why it works.

We can tell you *how*. In fact, the program included at the end of this article will produce a complete scrolling message made up of sprites in the border. You can change the message, and scroll whatever you like. Last month, Andrew Baines showed us how to put a clock in the border. Now let's see why it's possible and how it works.

But first, I should add that this is a vast area. It is the current limit of what we will probably ever see the C64 do. In this article I will merely scratch the surface. In the future we will dive further into the matter and explain other related possibilities.

Why it works

It's not something you'll find in the reference guide, or the programmers development manual. The reason? It's a mistake. Quite likely the first person to ever

do this, found out it was possible by accident.

The VIC II chip is able to adjust the width and height of the border. By shrinking it, it is possible to hide part of the text screen. This is used for smooth scrolling text - which is a topic within itself.

If we toggle the VIC chip register which determines whether the border is its normal size or slightly shrunken, and we do that right where the usual border should be, things go a little haywire.

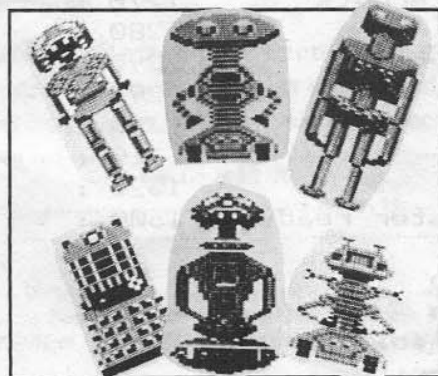
In short, the border disappears! Behind it are whatever sprites you decide to display. Rumours also exist that there may be a way of displaying text behind the border as well.

So, the VIC II chip gets confused. Right when it's expected to start displaying the border, it suddenly find it's time to make an adjustment to the border's width. For some design reason, it makes a big mistake about the whole deal and decides to switch off the rest of the border all together.

How

You thought we'd never tell you. Many readers have phoned, written and hammered down our doors to find out how it's done. The thought of the racket continuing into the holiday season worried us all. It had to be done. Someone had to tell the rest what to do.

Here it is. Sweet and simple. In es-



sence all you have to do is toggle the required location at the right moment, and the rest is automatic. The right location is, in this case, the top edge of the lower border. There are four borders in all.

The left and right border stretch the height of your display, one to the left and on to the right. The top and bottom border fill in the space in between. It is the bottom border we intend to erase by this method, giving us space for a scrolling message.

We need to toggle the border register right on the edge of the bottom border, which corresponds to the 250th raster line down the screen. The raster is of course that beam in your monitor or TV which draws the display, line by line. The top of the screen display, within the text area, starts at raster line 49. Everything in between these two figures is the normal displayable area of sprites.

Beyond location 250 and above location 49, sprites are only partially visible, or totally invisible. This allows space ships, aliens or whatever else you're displaying to scroll smoothly onto the screen and back off again.

Interrupts

To be sure that the border shrink register is toggled at just the right moment, we need to take a look at where the raster is, and when it reaches the right line, then it's time to do our stuff.

The best means of doing that is with a Raster Interrupt. Sixty times a second the operating system inside your C64 generates an interrupt - a request to temporarily discontinue the job at hand to look after some housekeeping jobs. These include flashing the cursor, and scanning the keyboard.

A special pointer, or vector, tells the C64 where the program is that it should execute when an interrupt is requested. We can change this pointer to our own program.

However, we also need to change the type of interrupt that occurs. Since the raster also scans the screen 60 times per second, it is well suited to be handled on an interrupt basis. By setting a certain register on, and writing a target value to the raster register, when the raster

reaches that location, it too will generate an interrupt and execute the program pointed to by the IRQ Vector.

But with both interrupts going at once, things will get a bit erratic. So we just use one. The raster interrupt. At the end of executing our routine to toggle the

border width, we must then execute the normal IRQ routine. Here's the assembly language program to set up the procedure and do the work. It's written using PAL, which uses the standard BASIC program editor and storage method. The SYS on line 10 tells the assembler to as-

(Continued on page 10)

```

10 sys 700
20 .opt oo
30 *= $c100
40 ;
45 ras1 = 49
50 ras2 = 250
52 del1 = $c005
54 ;
55 ; irq routine
56 ; for sprites in the border
58 ;
99 ;
205 :      jsr init
275 :      lda #$0a
276 :      sta del1
390 :      rts
399 ;
400 init sei          ;can interrupts
411 :      lda #$7f
420 :      sta $dc0d    ;bump count
430 :      lda #$00    ;interrupt low -
440 :      sta 788
450 :      lda #$c2    ;high address
460 :      sta 789
480 :      lda #$1b
490 :      sta $d011
500 :      lda #ras2
510 :      sta $d012    ;write first ras
520 :      lda #1
530 :      sta $d019    ;mask
532 :      sta where
535 :      sta $d01a    ;+ set raster
540 :      cli          ;interrupts
545 :      rts
550 ;
620 *= $c200
630 ;
640 ; new irq
645 :
650 rast lda $d019    ;raster ready
651 :      and #$01
654 :      beq rast    ;nup
660 :      sta $d019    ;yep
670 :      lda #$81    ; enable border
680 :      sta $d011    ; sprites
702 :      jsr alt      ; timer
703 :      lda #ras2
704 :      sta $d012    ;set next irq
705 :      jmp $ea31
706 :
760 :
900 reset sei
930 :      lda #49    ;interrupt low/
940 :      sta 788
950 :      lda #234    ;high address
960 :      sta 789
970 :      lda #27
990 :      sta 53265
1020 :      lda #240
1030 :      sta 53274
1042 :      lda #129
1044 :      sta 56333
1045 :      cli
1047 :      lda #21
1050 :      sta 53272
1060 :      lda colour1
1070 :      sta 53281
1080 :      rts
1100 ;
1110 ; hold border out
1120 ;
1130 fin lda #27      ;normal mode
1131 :      sta $d011
1140 :      rts
1200 alt nop
1250 :      ldy del1    ;hang around
1260 lp1 nop:nop
1270 :      dey          ;delay factor
1280 :      cpy #0
1290 :
1292 :      bne lp1
1300 :
1310 :
1320 :      jmp fin      ;finished
1600 :

```


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The lines beyond are never actually executed, but are assembled into true machine language. If this sort of terminology is beyond your interest, I suggest you skip now to the program at the end of this article which is a BASIC program you can type in and see the effects for yourself.

Raster IRQ

This is the routine that pulls the strings. It begins by checking that the interrupt was in fact a raster interrupt. (Line 650,651) This is done by a look at BIT one in location \$D019. When that condition is true, we write a one back to location \$D019 to set up for our next IRQ.

The border is switched from 25 to 24 columns. The correct value for the entire register is written, although only one bit

need be changed. (Lines 670,680). \$D011 is the location in demand.

Having done that, the VIC II chip responds with confusion, and switches off the border. For how long? Until we switch back to 25 rows. If we wait too long, the whole screen will disappear. The delay is controlled with the value of location \$C005. This is set to 10 by the start of the setup routine.

The loop for delay is executed by a JSR ALT. (Line 702) From there a delay is set up using the Y register. At the end of it all (Line 1320) we jump back to FIN (Line 1130), and the border is set back on. An RTS takes us back to base (Line 703). We write the next value for our raster interrupt, and then call the standard IRQ routine with a JMP to \$EA31. Short and simple.

Well, you're welcome to use the tech-

nique as a basis for your own routines. But for those who'll rather watch and learn, the BASIC program which follows does it all. There's also a scrolling message in the border. You can make your own demo's with this one!

To change the message you'll need to poke the ASCII values, with an asterisk after the last character to locations 50622 and onwards. The maximum message length is 255 characters including the asterisk. Only a few characters outside of the alphabet are catered for, such as the full-stop and question mark.

Well, have fun. Oh, if you get tired of punching this one in, a full working version complete with message editor appears on Disk Magazine Nine. More on this topic soon, so stay tuned.

(More information pages 11/12, program listings pages 14/15/16.)

What is an Interrupt?

ALTHOUGH THE reference manual contains all you need to know to use the interrupt, it doesn't explain how. And the users manual, need we say, doesn't even mention the subject. So what's it all about?

Interrupts are generated by the computer hardware, not software. However, software can detect the event, and act on it. The effect is like a regular pulse or prod, which the operating system uses as a reminder of when to do certain jobs.

These jobs are background tasks that must take place no matter what else is happening. Such things as scanning the keyboard, and updating the TI\$ clock for example. The interrupt routine automatically checks for a key press, and stores it where the program currently running can make use of it.

The location of this routine pointed to by a VECTOR. This is a two byte location, containing the memory address in low/high format - that is the least significant byte first and the most significant byte last. Any memory location in the computer can be described or addressed by two bytes.

It's rather like a street number for a

house.

This vector is located at locations 788 and 789 (\$0314, \$0315). By changing the values of these locations we can make the interrupt perform additional program code, as well as the usual interrupt routines. We simply put the start address of our own program into the interrupt vector, or IRQ (Interrupt Request) Vector.

The prod or IRQ request takes place sixty times per second. So every 1/60th of a second the interrupt routine/s are executed. This is ideal if we want to add a small wedge to perform some special function. We can also change or add to the number of possible events that can trigger an interrupt.

These include sprite collision, and the position of the raster beam. It's possible to filter out which event causes a genuine interrupt, and in this way give different things priority over the interrupt request line, and therefore over what program code is then executed.

How

To change the interrupt vector, we cannot simply charge in gun hoe and POKE new values in, since the interrupt

may well occur right when we're in the middle of changing things. The best way is to use machine language, and to first switch interrupts off using a special command.

For a brief idea of how this is done, take a look at the source listing (IRQ Set-Up) with our Sprites in the Border article. The first line of the SET-UP routine contains the instruction SEI. This stands for SEt Interrupt mask, and will stop any further interrupts occurring.

Once the interrupts are turned off, you have about .009 seconds before things get really mixed up, and the computer crashes or hangs. This may sound like a small amount of time, but in machine language term, it's a two week holiday. The next four lines of our program should change the value of the interrupt vector.

At the end of it all, the interrupts must be turned back on, with a CLI command - or CLear Interrupt mask. Experimenting is a little tricky, but by reading other peoples programs, you'll learn a lot. Take a look at out sprites in the border routine for further information. □

Feature

Entering the BASIC program

Two programs are included. The first is used to raise the lower limit of BASIC memory. This gives us space for sprites. The second is the four or five machine language routines to produce the scrolling message made up of sprites in the border.

The DATA statements from line 2071 to 2140 are the ASCII values for the message to be printed. You can change these if you like, but if you add or subtract any, be sure to adjust the values in line 50 accordingly.

Type in the first program and save it under whatever name you like. Then type NEW and enter the second. DON'T run either until you've SAVED them! Save the second program as SP.BAS. Then type new, LOAD and RUN the first program.

The main program will then LOAD and RUN after memory has been adjusted. There will be a brief delay whilst the data is POKED into the sprites and machine code areas. Then a message will appear in the lower border.

Find Typing Mistakes

You're bound to make a few. So here's some common ones.

OUT OF DATA ERROR : You've missed out a number somewhere. **DATA MISMATCH** : Something has been entered as a letter instead of a number.

ILLEGAL QUANTITY ERROR in (10-60) : You've missed out a comma.

This program appears, complete with message editor, on *Disk Magazine Nine*.



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Interrupts - Reference Chart

Location

Use

Glossary

\$0314 - \$0315 Vector: Hardware IRQ
(788 - 789)

SEI: Set Interrupt Mask

CLI: Clear Interrupt Mask

\$D019
(53273)

Interrupt Register

6	5	4	3	2	1	0
Any			L- Pen	Sprite to Sprite	Sprite to back	Raster

VIC: Video Interface Chip

IRQ: Interrupt Request

FLAG: Either 0 or 1

Mask (1 = Enable)

\$D01A
(53274)

Same as above

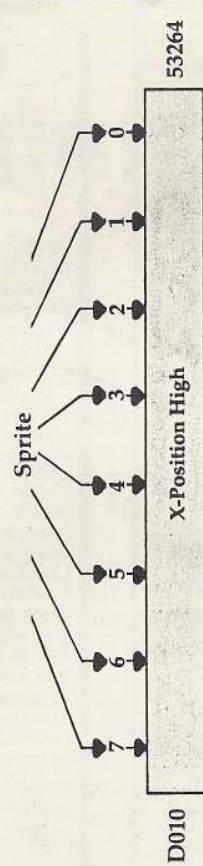
MASK: Filter to control which BITS in a BYTE are recognised.

6566 Video Chip

D018	VM13	Screen				VM10	Character Base			53272
		VM12	VM11			CB13	CB12	CB11	X	
D019	TRQ	Interrupt ← Sense →					LP	SSC	SBC	53273
D01A		Interrupt Enable →					Sprite Collision with			53274
						Light Pen	Sprite Back			Raster

D020	X	Exterior	53280
D021	X	Background #0	53281
D022	X	Background #1	53282
D023	X	Background #2	53283
D024	X	Background #3	53284
D025	X	Sprite Multicolor #0	53285
D026	X	Sprite Multicolor #1	53286

Sprite 0	Sprite 7		
→	→		
D000	D00E	Position	X
D001	D00F		
D027	D02E	Color	X
53248	53249	53262	53263
→	→		
Sprite 0	Sprite 7		



D015	Sprite Enable *	53269
D017	Y-Expand	53271
D01B	Background Priority	53275
D01C	Multicolor	53276
D01D	X-Expand	53277
D01E	Interrupt: Sprite Collision	53278
D01F	Interrupt: Background Collision	53279

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Sprites in the Border program 2

```

1 rem sprites in the border!
5 print"Spoking data.. please wait!"
10 fori=49408to49455:reada:pokei,a:next
20 fori=49664to49744:reada:pokei,a:next
30 fori=49920to49982:reada:pokei,a:next
40 fori=50176to50322:reada:pokei,a:next
50 fori=50432to50687:reada:pokei,a:next
60 fori=2048to3966:reada:pokei,a:next
70 :
100 poke53280,0:poke53281,0:print"Stthis is it!"
110 sys49920
120 sys50432:goto120
1000 data 32, 9, 193, 169, 10, 141, 5
1010 data 192, 96, 120, 169, 127, 141, 13
1020 data 220, 169, 0, 141, 20, 3, 169
1030 data 194, 141, 21, 3, 169, 27, 141
1040 data 17, 208, 169, 250, 141, 18, 208
1050 data 169, 1, 141, 25, 208, 141, 2
1060 data 192, 141, 26, 208, 88, 96
1200 data 173, 25, 208, 41, 1, 240, 249
1210 data 141, 25, 208, 169, 129, 141, 17
1220 data 208, 32, 66, 194, 169, 250, 141
1230 data 18, 208, 76, 49, 234, 120, 169
1240 data 49, 141, 20, 3, 169, 234, 141
1250 data 21, 3, 169, 27, 141, 17, 208
1260 data 169, 240, 141, 26, 208, 169, 129
1270 data 141, 13, 220, 88, 173, 0, 192
1280 data 141, 33, 208, 96, 169, 27, 141
1290 data 17, 208, 96, 234, 172, 5, 192
1300 data 234, 234, 136, 192, 0, 208, 249
1310 data 76, 60, 194, 255
1400 data 32, 45, 195, 32, 0, 196, 32
1410 data 0, 193, 96, 32, 0, 197, 169
1420 data 10, 141, 240, 192, 169, 4, 141
1430 data 241, 192, 173, 241, 192, 240, 238
1440 data 206, 240, 192, 240, 3, 76, 23
1450 data 195, 206, 241, 192, 206, 240, 192
1460 data 76, 23, 195, 234, 169, 8, 141
1470 data 5, 192, 169, 4, 141, 241, 192
1480 data 169, 64, 141, 240, 192, 96, 255
1500 data 169, 255, 141, 28, 208, 141, 16
1510 data 208, 141, 21, 208, 169, 254, 141

```

Sprites in the Border

Program 1

```

10 rem basic boot
20 rem raises bottom of basic to
30 rem $1000 (out of the way of
40 rem sprites or character)
50 rem
60 rem also loads next program
70 rem by andrew farrell
100 :
101 poke53272,23:
102 m$="sp.bas":rem prog name
103 dv=8: rem device number
105 poke 53280,0:poke53281,0
110 print"Please Wait - Loading.."
120 print"Load"poke44,16:poke642,16:poke16*256,0:new"
130 print"Load"+chr$(34)+m$+chr$(34)+", "dv
135 print"Load"run"
137 poke198,5
140 poke 631,13:poke632,13:poke633,13:poke634,13:poke635,13:print"Load":end

```

```

1520 data 37, 208, 169, 246, 141, 38, 208
1530 data 162, 7, 138, 72, 10, 170, 169
1540 data 251, 157, 1, 208, 169, 255, 157
1550 data 0, 208, 104, 170, 202, 16, 237
1560 data 32, 49, 196, 32, 122, 196, 96
1570 data 162, 255, 232, 189, 190, 197, 201
1580 data 42, 240, 25, 201, 45, 240, 27
1590 data 201, 46, 240, 31, 201, 63, 240
1600 data 35, 201, 32, 240, 39, 24, 233
1610 data 32, 157, 0, 207, 76, 51, 196
1620 data 169, 255, 157, 0, 207, 96, 169
1630 data 59, 157, 0, 207, 76, 51, 196
1640 data 169, 58, 157, 0, 207, 76, 51
1650 data 196, 169, 60, 157, 0, 207, 76
1660 data 51, 196, 169, 61, 157, 0, 207
1670 data 76, 51, 196, 162, 7, 169, 1
1680 data 157, 64, 192, 157, 53, 192, 157
1690 data 39, 208, 202, 16, 244, 169, 0
1700 data 141, 48, 192, 141, 49, 192, 96
1800 data 173, 48, 192, 240, 100, 169, 1
1810 data 141, 52, 192, 162, 255, 206, 48
1820 data 192, 232, 224, 8, 240, 84, 189
1830 data 53, 192, 240, 6, 14, 52, 192
1840 data 76, 15, 197, 138, 141, 50, 192
1850 data 10, 170, 222, 0, 208, 189, 0
1860 data 208, 201, 255, 240, 9, 174, 50
1870 data 192, 14, 52, 192, 76, 15, 197
1880 data 174, 50, 192, 173, 16, 208, 45
1890 data 52, 192, 240, 17, 173, 52, 192
1900 data 73, 255, 45, 16, 208, 141, 16
1910 data 208, 14, 52, 192, 76, 15, 197
1920 data 169, 1, 157, 53, 192, 173, 52
1930 data 192, 13, 16, 208, 141, 16, 208
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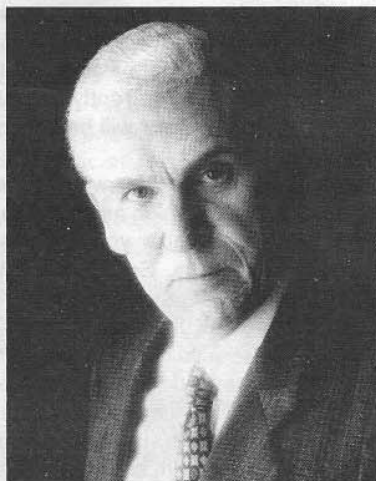
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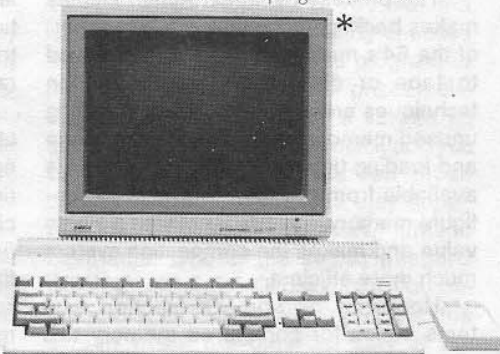
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Action Replay MK. III

- a new backup cartridge



WHAT WOULD you say if I said that there was a cartridge that could backup any of the latest programs that don't access the drive? I mean ANY of the latest protection schemes. Then after that, save your software with a fastloader called WARP*25 so that your favourite game could load in ten seconds.

Imagine, a 1541 loading a 200 block program in less time than it takes Andrew Farrell to go 0 to 100 km/h, and I don't mean in souped-up Reboks. All this and more comes with a new cartridge called Action Replay MK. III.

The documentation is very comprehensive and goes through all possible problems that a user could encounter. Every aspect is well explained - it's nice to see documentation prepared for the total novice.

Red in colour, Action Replay comes with two buttons located at the right hand side - each button has a specific function. The farthest right button is a reset button that resets even the most stubborn of programs - I haven't seen one yet that can resist. The reset returns you to a state of power up except that any programs that were residing in memory are still there, basic programs will of course be NEWed.

The other button relays you to a menu which controls the majority of the cartridge features including the backup facility, picture saver, sprite utilities, monitor and disk utilities.

The process by which Action Replay makes backups is by taking a "snapshot" of the 64's memory, which is then saved to tape or disk. Efficient compaction techniques are employed to avoid saving unused memory - thus saving disk space and loading times. A good feature that is available from the reset menu is to configure memory, this fills RAM with a single value and makes the compaction system much more efficient.

However, as some protection systems check for configured memory this

method can't always be used.

Multi-coloured pictures can be saved from games and graphic packages to either disk or tape. Once the desired picture is on-screen press the menu button and follow a few prompts and presto, your picture is saved in either Blazing Paddles format or Koala Pad format. If the computer is not currently in multi-coloured mode, an error will be returned advising you.

Sprites are catered for with two well thought-out utilities which allow you to go as far as to customize your games to your personal tastes. So you don't like the sprites - break into the program with Action Replay MKIII, save the sprites, redesign them and load them up and play your new customised version. This could add a whole new dimension to some games. Imagine, *Defender* with a flying thong, or *Pac-man* with killer tomatoes instead of ghosts.

"When the going gets tough, Action Replay MK. III turns off sprite collision!". This intriguing piece of utility is very handy in conquering those unbelievably difficult levels of your favourite games. MK. III allows either sprite to sprite, sprite to background or both types of collisions to be disabled.

The monitor included in the base model of Action Replay is quite limited with respect to the amount of commands you are able to use - still there are some useful onwa - Note: A full monitor that resides in the ROM is available in the Action Replay MK. III 'Professional' cartridge. (Do they mean professional Pirates? - Ed.)

One more option on the menu is disk utilities - this allows you to do various things including to prepare disks for backup. There are two formatting options to choose from, the first being a fast format (just under 20 secs), the second being the good old rumbling 1541 speed. Personally, I find it safer to format at the normal speed - I have acquired an awful lot

of corrupted directories since the introduction of 20 second formatters.

For those poor sods who buy software on tape there is a Nova transfer option available from this menu, to transfer Nova and slowload files from tape to disk - including multistage programs such as Winter Games.

In addition to its backup facilities, Action Replay MKIII also provides a powerful disk fast loader that is available on call. To enable the fast loader just hold down the Commodore key and then press the menu button on the cartridge. The fast loader loads up to five times faster than convention loading - one very good point about this built in fast loader is that it is totally transparent to the normal operating system. That means absolutely no compatibility problems.

Included with the fastloader enable is the ability to call up a non-destructive directory, this can be done type '\$' and pressing return. A directory scrolls up in front of your eyes, then you can move the cursor up to the desired program and press either F1 or F3, they load and run the program or load without running it.

An upgrade is available for the MK. III, although I wasn't able to review it - the features are definitely something to think about spending the extra \$30 to get a hold of. A six times turbo-save as well as a five times turbo-load, single stroke commands for load, save, directory and error channel etc, also included are some powerful tool kit commands such as OLD, DELETE, LINESAVE, MERGE, COPY etc. The big bonus about this extra ROM version of the MK. III is the full "floating" machine code monitor, with features such as two way scrolling and bank switching.

WARP*25

This is it! Bang, wizz, woosh. The only fastload ever seen to load most programs under ten seconds (by these eyes

anyway). This speedie little file converter is supplementary to Action Replay MK. III, and is almost worth the price by itself. Yes, you guessed it, the *25 means 25 times faster - and that's big bickies in anyone's language.

Its time to dig up the datasette, well it was for me anyway. The utilities that are included are on tape so hit C= and RUN/STOP and wait... I recommend that the very next thing you do is save WARP*25 to disk for next time. Once WARP*25 is up and running you see a menu with four options, directory, write Bootloader, transfer a file and exit.

To convert a program after creating a single file version of it by using Action Replay MK. III, select transfer a file and then enter the file name -

you can call up the directory if the need arises. The program then loads in either one or two passes and the output disk can either be on the source or a separate

disk. Since only about three average game files can be stored on a disk and files are actually a little longer than original files you may have problems in converting a whole disk to this format. WARP files have a special file type designation and the file name is prefixed with "??". One point to note is that WARP files can neither be renamed or disks be validated.

Below is a table of times that we compiled to show you the power of the super-fast loader.

Title	Norm Multiload	Single file load	SFL Power Cart. fastload	SFL Action Replay	WARP 25 no cartridge
Commando	174 secs	122 secs	32 secs	56 secs	9.7 secs
Pitstop II	144 secs	120 secs	24 secs	26 secs	9.1 secs
Antirad	84 secs	140 secs	37* secs	38 secs	10.7 secs
Archon II	201 secs	114 secs	33* secs	32 secs	9.0 secs

Pro-Sprite

This is quite a powerful sprite editor. It has some nice features such as viewing your sprites in animation. This makes

it possible to save sprites from your games and then edit them to your taste, reload then using MK. III and away you go.

Pro-sprite has features such as mirror, flip, rotate and animate. Also a nice addition is the ability to create data statements for basic programs will would make calling up the sprites from basic very easy, even for the novice programmer.

Action Replay MK. III is the best cartridge on the market when it come to backing up software, also with the en-

hanced version it competes very well against other tool kit cartridges as well. I am quite impressed so much so that I intend on buying myself an enhanced version for an early christmas present. □

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Blitz 64 Compiler

by Andrew Farrell

NO EASIER way is there to speed up a BASIC program than to compile it. Graphics, text and number crunching are all performed at speed many times faster than a normal BASIC program.

The process of compiling a program is a halfway step toward machine language. Normally BASIC is interpreted when you type RUN. Each instruction must be checked for correct syntax, and then the right routine in the BASIC ROM found and executed. There is much swapping between formats of data storage such as integer and floating point variables, and in the end the result is slow.

Compiling does part of the interpreting job before the program is run. The result is code that is more efficient, takes up less space, and executes far quicker. There's much more to the job of compiling, but in essence that's what happens. For once you don't need to know why to

do the how.

Until now there has been no compiler for the C64 that worked quite as well as this one, Blitz. It handles far more variations and the normalities of Basic programs than any other compiler including Petspeed and DTL.

What's more, Blitz is easy to use, and will work from a single drive without disk swapping during compilation. I love it. Windows, the menu system from disk magazine five, six and seven, uses machine language routines for drawing boxes and frames. However the rest of the program is in BASIC.

Together they run well, but compile the whole lot, including the SYS calls, and you get a very fast little number, that works even better.

Documentation is a mere 12 pages. They haven't skimped on it. There isn't much to say. First a few features. Blitz

compiles most programs without alteration. It handles extensions to BASIC. The resulting code (called P-Code) cannot be altered or listed by users. Large programs become shorter, and yes, unfortunately short programs may become larger.

The C128 version, which we haven't yet seen, also handles several extra features such as batch compilation, where all programs on a disk are compiled one by one.

Without repeating the manual, there's little more to say. An excellent program, recommended for any with a big program they need to run faster. Works well on all software we've tested it with to date, with very obvious improvements in speed of execution.

Distributor : Pactronics
Publisher : Supersoft
Retail : \$36.95 □

The Comodem

A Commodore dedicated modem

COMODEM FROM Computronics, makes all the problems inherent to hooking the 64 up to a modem disappear, as the modem plugs straight into the user port. The Comodem has both 300 and 1200/75 baud transmission rates and is capable of both originating and answering. Just plug the modem into the user port, load up the communication software and off you go.

The software itself is fairly simple, no bells or whistles, but it gets the job done. There are facilities for both Viatel and standard 300 baud transmissions to be received, so it is possible to hook on to most Bulletin Board Systems with the Comodem. After loading the boot program off the disk provided, the option for either viatel of 300 baud is displayed.

300/300 baud Terminal:

A menu with three choices is displayed

before you in a very bland all lower case screen.

(1) Terminal mode. In this mode simply dial the number required and hit return when the line answers.

(2) Review values. In this mode the communication values can be changed

accordingly to the prompt driven menu - these include baud rate, parity, stop bits, word length, auto line feed and colour. All these variables have default values in case of ignorance and/or confusion.

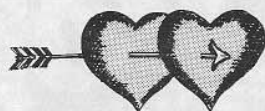
(3) Buffer. This option allows you to review the data in the buffer - this is useful if you want to capture information of a BBS and print it out at a later date.

One interesting feature of this modem is the slot in the rear of the modem that allows your telephone to be plugged in.



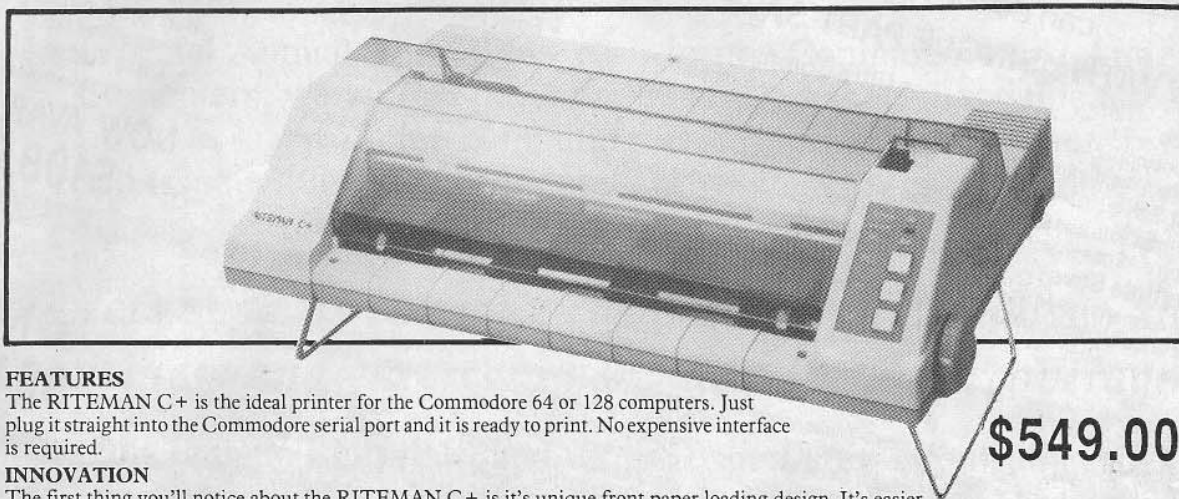
This represents a much more logical and convenient approach to the setup compared with most other situations, which require a double adapter for the phone - also the modem comes with a 5 metre long phone extension.

The Comodem represents a good buy at \$249.00, its nearest competitor is Modem 64/129 at just under \$300 - both are of similar quality with the modem 64/128 pulling ahead in aesthetic appeal, and bundled software. □



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INTELLIGENCE

Even more impressive is the print features of the RITEMAN. Turn it on and it becomes an enhanced Commodore MPS801, only faster and smarter. It'll then work fine with original Commodore software. Send it the right software instruction though (or change a dip switch) and it becomes Epson compatible. Use Doodle, Printshop or any one of the more advanced print programs or word processors.

Because the RITEMAN C+ has the full implementation of PETSCII in ROM, it doesn't waste time individually drawing the dots that make up special symbols such as hearts and circles. RITEMAN C+ will sometimes print three or more times faster than conventional printers with conventional interfaces.

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The Australian Commodore Review described it as: "the printer of my dreams . . . I am in love with this well thought out, feature packed printer . . . The RITEMAN C+ is an attractively styled, thoughtfully designed printer which is 100% compatible with the Commodore 64 computer. By 100% I mean that this printer plugs right into the serial port and, except for the amazing print speed of 105 characters per second, behaves like an enchanted MPS801." (The new "Super" RITEMAN C+ now prints at 120 characters per second.)

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Book Review:

How to get the most out of GEOS

IN ESSENCE this book takes up where the manual leaves off. It is designed to for first time GEOS users, but for those who are making the transition into GEOS. It's also for programmers and users who need to get into the raw information a little more.

Included is a disk, containing a working version of all the programs listed in the book. The space used to provide a full line listing of this software seems a little wasted.

The preface begins by examining the weaknesses and virtues of GEOS, and makes a plea that all users should have original copies of any programs discussed. It also requests that any information included not be used to further attempts to steal or pirate GEOS programs. Such information is in the book. Perhaps they should have left it out.

Inside the text is spacious, with few

pictures. The result is a publication that would primarily appeal to the more serious user, who is keen to learn more, and do a little digging to find what he/she wants to know.

A summary of GEOWRITE, GEOPAINT, DESKTOP and Accessories is included, with a very well written hints section at the end of each chapter. Explanations are clear and concise. In all about a third of the book is taken up with this material.

Next comes the real meat. Programs and utilities. How to get text and graphics in and out of GEOS. Invaluable for old hands, or even new users who want to jazz up their creations

using other packages. Despite the many picture formats on the C64, all are very similar. With these programs and others like them, you can swap between formats easily.

An assembly language routine for transferring Doodle files to GEOS is included, although little commentary is included.

Other useful gems include an UN-SCRATCH program for recovering erased files! Sounds tricky, and it is especially in GEOS. Now you can do it. Another tricky

one alters a backup GEOS disk so that you no longer need to boot the original - it's called Easy Load.

The last third of the book is called Inside GEOS. Information about file structures, memory and disk usage and graphics storage are covered. Mainly only useful for programmers.

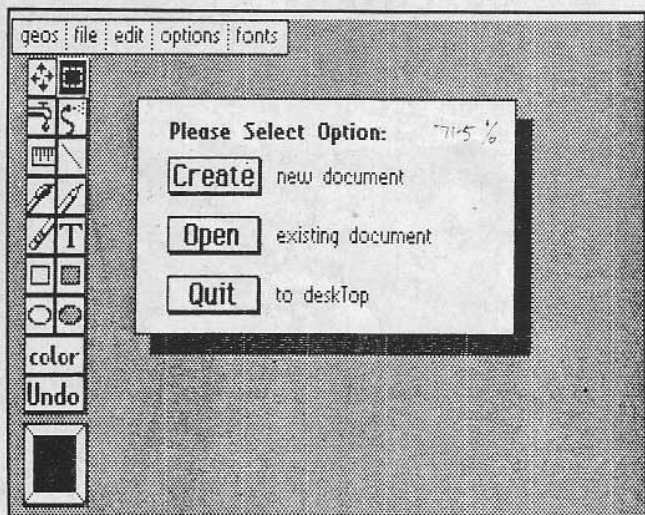
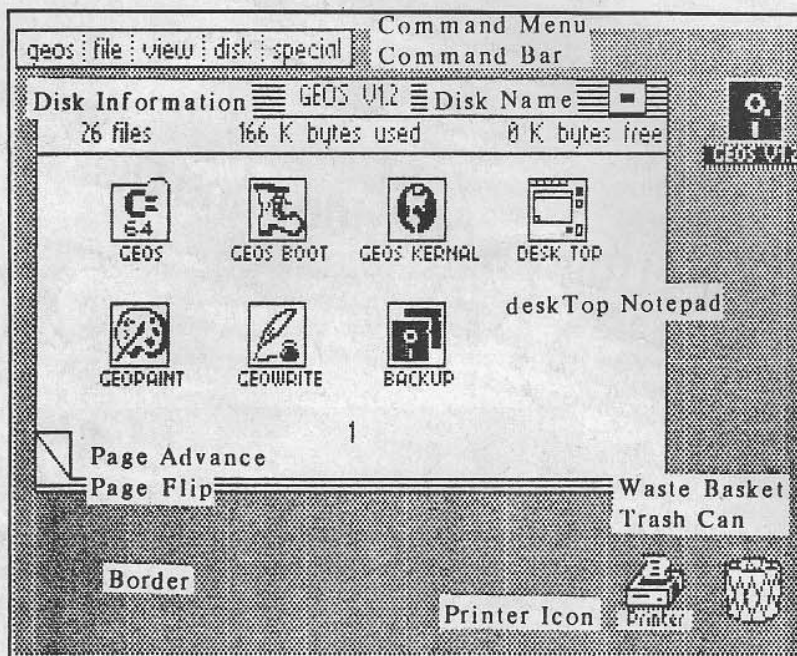
The Appendices which conclude the book are rather brief. With most of the topics already covered, only a few short items are discussed.

Conclusion

No doubt this book would have its uses. A definite no for GEOS only users. However for hobbyists who use a range of programs, this one is a real boon. Its greatest value would be for programmers interested in customising the package or writing their own software.

Distributed by Pactronics: (02) 407 0261

Rec. Retail: \$59.95 book and disk □

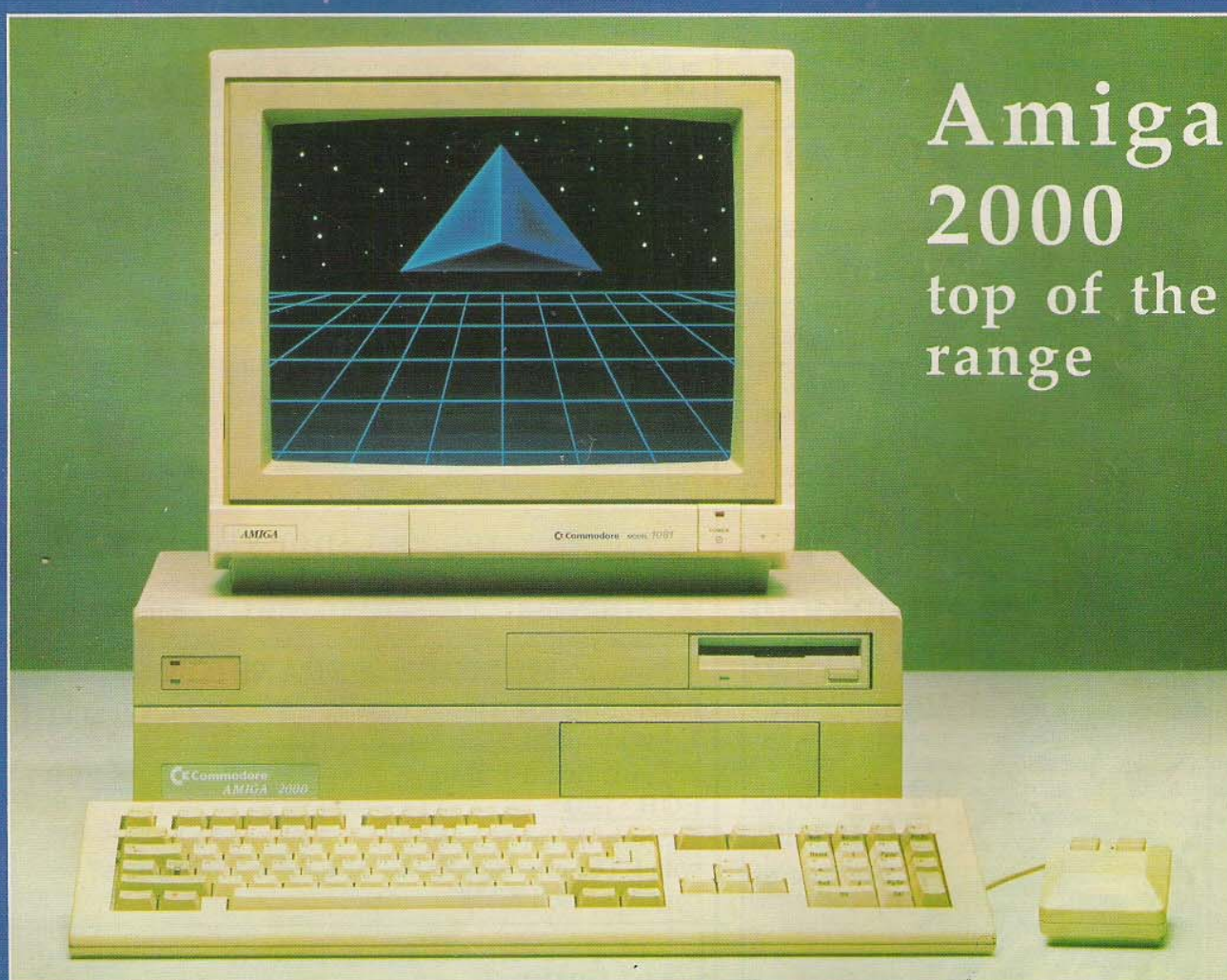


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Editorial

Documentation is meant to make using programs easier. Unless it's the sort that's really an excuse for software protection. Have you been instructed to turn to page 22, line 3, word 5 lately? Perhaps you'd mislaid the manual, or it may have been the third or fourth time you'd run the program in as many hours.

It starts to grate on one's intelligence when the very machine that is supposed to improve productivity is turning into a novelty item for people who think up means of protecting software.

Software houses, let's keep it simple. If protection is necessary, put it on the disk or in a dongle, but not in the manual, please!

This issue of the Australian Amiga Review was produced with support from Amiga expert dealers:

MicroComputer Spot in New South Wales

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Andrew Farrell

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Ideal for the power-hungry

4. GIZMOS - some more helpers for your Amiga

A package of useful utilities, such as
Calendar, Memopad, Calculators

5. Hints & Tips -

Pagesetter, keyboard possibilities,
Workbench techniques etc

16. Terrorpods -

Another great game from the makers
of *Barbarian*

Watch out for the Virus!

Some irresponsible idiot is spreading an Amiga program which puts itself into protected memory and stays there until the computer is switched off completely.

It writes itself to every disk you use during that session and will strike without warning to display its stupid message before re-booting your system and destroying all the data you have in memory up to that point.

Fortunately there is a fix for the virus. Enter the CLI and put the suspect disk in the drive and type INSTALL DFO: (or DF1: if you use an external drive). This overwrites the Virus boot and you're safe. You could use a track and sector editor to examine Track 0, Sector 0 and erase the Virus data that way too.

Please be warned and check every disk you get from anyone. Use the write protect tabs to prevent the Virus being written to your disks (especially originals!) Warn all your contacts and tell them of the fix. Remember, the Virus can live through a reset so if you see the silly message you must switch the Amiga off completely before applying the fix to every disk used during that session.

BE CAREFUL, DON'T SPREAD THE VIRUS.

Bix, 13 October, 1987

Amiga 2000 - top of the range

by Andrew Farrell

Top gun in the Amiga range, the mighty 2000, has much to offer the serious user. However, there's also plenty for us hardened hobbyists and happy hackers to play with to our heart's content.

I've had one of these beasts on my desk for some weeks. Out of sheer guilt, I thought it was high time something was said about what the 2000 can really do.

My version is fully souped up. Inside the sturdy steel cabinet is a full three megabytes of RAM, the Janus hard drive, bridgeboard and 5 1/4 inch disk drive. A standard 3 1/2 inch drive is built in.

The keyboard is now a hybrid arrangement of IBM and Amiga keys, which may at first be confusing. Key tops are large, well spaced, and generally provide a pleasant light but positive feel. Several keys have been repositioned compared to the Amiga 1000. On the whole each change is largely a matter of what you're used to or prefer.

Options

Options are what the Amiga 2000 was designed for. If you plan on expanding your machine in a big way, then the 2000 is the answer. It has the room and potential for expansion in every direction. A typical set-up would at least contain the PC Bridgeboard and hard drive. Extra memory makes multi-tasking not only possible but practical.

A modified version of Workbench is used which contains additional software for PC emulation. My startup-sequence was modified to transfer control to Janus at power up.

The on-board twenty megabyte hard drive was partitioned for ten megabytes each way between MS-DOS and Amiga DOS. With Janus installed there was no further room for an additional on board 3 1/2 inch drive, as the hard drive is situated behind the second 3 1/2 inch drive cover slot.

With so many devices to power on and initialise or make Amiga DOS aware of their existence, the time from when you flick the switch until when the Workbench is ready for use can exceed 100 seconds. As far as hard disks go, Janus is not exceptionally fast. (See Table.)

At first I wondered just what I

"It would put most other similarly priced personal computers to shame."

would put all this extra power to. I almost had to remind myself that the Amiga is a multi-tasking machine. Now was the chance to really put that ability to work. My first experiment was to run three large projects simultaneously. I chose *Sonix*, *Wordperfect* and *Digiview*.

Having loaded a HAM picture into *Digiview*, and started *Sonix* playing the Miami Vice theme, I returned to *Wordperfect*. All went

grams request or simultaneously use the same portion of memory.

Other problems may also occur with priority over the serial and parallel port. Some applications will work together, providing they're booted up in the right order. For example, *Diga!* will not operate with the serial port already allocated. *Sonix* will always allo-

cate itself to the serial port if it is free, in case of the need for Midi input/output. By booting *Diga!* first you can have both these programs running.

Most of these sorts of problems can only be discovered by trial and error. As time goes by we will be producing a list of compatibility problems with the entire Amiga range.

Some games refuse to work at all on the Amiga 2000. Some programs may work if you first disable

Bridgeboard. On my system the PC side of the Amiga 2000 shared 10 megabytes of the Janus hard disk. All the programs tested worked without any problem on PC emulator.

Files may be transferred from one DOS format to another using special commands available from MS-DOS.

A simpler method for moving small amounts of text is using the cut and paste in conjunction with the Amiga's own clipboard.

Whilst operating the PC emulator, Amiga's usual multi-tasking is still available. MS-DOS merely boots up as a separate window within the Amiga Workbench environment.

We tested one multi-tasking job that really demonstrated the true power of this system to the full. On *Ventura*, a desktop publishing package running under MS-DOS, we instructed the Amiga to print out a page to the laser printer.

At the same time on the Amiga side, *DIGA!* called an overseas database and made a connect. Meanwhile a spreadsheet was recalculated under *Maxi-Plan* (...the plus version will be out soon.)

The page was printed, *DIGA!* connected, downloaded a file and disconnected, and the spreadsheet added up.

Impressive stuff. In day-to-day use one rarely finds the time to set up such an experiment with practical value. It does take some getting use to the true power of the Amiga especially with so much expansion at hand.

Conclusion

The Amiga 2000 is truly a serious machine. It would put most other similarly priced personal computers to shame. For the hobbyist nothing comes close. There is so much to explore and tinker with.

Ideal for the intending BBS system operator, or just the power hungry. □

Janus Hard Drive Performance Table

File Create/Delete :	create 4 files/sec, delete 8 files/sec
Directory Scan :	36 entries/sec
Seek/Read test :	42 seek/reads per second
r/w speed 512 bytes :	rd 19134 bytes/sec, wr 11650 bytes/sec
r/w speed 4096 bytes :	rd 21140 bytes/sec, wr 14644 bytes/sec
r/w speed 8192 bytes :	rd 21140 bytes/sec, wr 14894 bytes/sec
r/w speed 32768 bytes :	rd 21312 bytes/sec, wr 14894 bytes/sec

well. However after some time of swapping to and fro between these applications, a Guru error appeared and it was time to wait a minute for the system to reboot.

Further experimentation produced similar results. Whilst it was easily possible to have two large programs operating at one time, complex tasks seem to trip over very quickly.

The usual explanation for this problem is that Amiga programmers are still coming to terms with the machine. Memory requirements need to be carefully handled to avoid problems where several pro-

grams refuse to recognise the existence of certain devices. These are primarily utilities that haven't been properly written. Some disk copy programs won't run.

Having a hard disk is a big plus. It's possible to put all your printer drivers, fonts and day to day utilities in the appropriate directories and no matter what you're doing they're all there ready to use.

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GIZMOZ - some more helpers for your Amiga

by Adam Rigby

Ideally the modern computer's role is to put the conveniences of a desktop within the easy reach of your mouse.

In the case of the Amiga this is made possible through the Workbench. This is all fine and dandy, but the actual utilities that arrive with the Amiga, such as Notepad, are not quite as useful as they could be.

This is where Digital Creations of California have come up with a nice set of more useful utilities, called *Gizmoz*. With this software package you could make your Amiga replace all those desk-cluttering objects. Included in the *Gizmoz* package are a Calendar, Rolldex, Memopad, Terminal, Calculators and various utilities which make life with your complex computer companion easier.

The package

Gizmoz Productivity Set comes in a small clip-ring folder with a 3.5" diskette in the front cover. The manual itself is very comprehensive and well thought out. Everything is covered so as to stop the uninitiated user getting too confused, but it is brief enough so you can find the facts easily. *Gizmoz* does not have a copy of Workbench on it, as there was not enough room to install the operating system - as this would imply, it is much easier to use *Gizmoz* with an external drive.

Gizmoz Calendar

The *Gizmoz* calendar tool is a two hundred year perpetual calendar system that will allow you to keep up to 50 lines of appointments per day in a totally free format. The main bonus in using this utility is to have it in the back of memory, as when it encounters a reminder signal numerous bells and whistles will call the reminder to your attention.

The way it operates is very simple and exceedingly easy to use. If the computer encounters an asterisk in the first column of any line it reads the next few characters and as long as they conform to a time setting it will remind you when the internal clock matches the reminder time.

After testing the reminder sys-

tem on the calendar I discovered that it worked, and that's the main thing - even if the noise that radiates from the .02 watt monitor speakers was irritating enough to put a hammer to it. One other feature that could turn out to be very useful is the search option. This allows a specific string of characters to be located with the minimum of fuss - this could have many applications, eg search for "Justine's Birthday".

Gizmoz Rolldex

Just as the name implies, the Rolldex stores the names and addresses of business associates and friends. As with most other utilities in *Gizmoz* the format for the Rolldex is totally free, this allows notes and other special details to be entered on the Rolldex cards. The system is very easy to use and doesn't take up much of the Amiga's memory.

The most amazing thing about the Rolldex system is that if you have a modem connected with autodial facilities the Rolldex will dial for you. There is an option for both pulse dial and touchtone depending on the type of phone you have.

There is also a search facility on the Rolldex that allows you to search from the current position in order to match a specific string. As you can see, the Rolldex can take all the work out of a heavy dial around session.

Gizmoz Memopad

Amiga's own Notepad has some inefficiencies which make it slow and difficult to use. Memopad seems to have been able to cure most of these problems with simple lateral thinking and efficient programming.

Not only is Memopad a lot nicer to use, it is also a great deal faster. It is almost good enough to use for a 'fake it till you make it' wordprocessor. All the edit commands are there, cut, copy, paste, find, and change, plus a few commands which make things a little faster to work with such as

'Select all' and 'Find next'.

Keyboard shortcuts are also to be found in Memopad, these include move by words, lines and to the end and beginning of text. Memopad, however does have to lose one feature that the good old Notepad has - the ability to handle multiple fonts.

The main reason for the slowness of Notepad is because it uses a variety of fonts, of which some are as much as three times larger than normal text. If, however, the loss of multiple fonts does not bother you I think you will find that Memopad performs better than Notepad.

One facility that the Amiga's multitasking allows which proves to be quite useful is the ability to boot up a second Memopad and cut and paste between the two different documents.

This allows the user to call up old documents and cut bits and pieces out and include them in current work without any major difficulties.

Gizmoz Black Book

No, this is not where you store you girlfriends' phonenumbers.

This is a printing utility that allows you to print out all the various files created by the *Gizmoz* package. Black Book is similar to the other utilities in that it is very simple and easy to use - all you have to do is enter the type of file you are going to print, set a few simple format codes and away your printer goes. It will print from all the previously mentioned utilities and adapt itself to the specific needs of each.

The results from this utility are displayed in the back of the manual and seem to be very clear and well set out.

Gizmoz Terminal

This particular terminal package seems to have most things you would expect on a communications program - however no 1200/75 baud rate is included. A variety of terminals are available for use, these include Dec Vt100,

ADM3A, ANSI, TT Y and Televideo 925.

Also available on the Terminal package is a facility to capture and save all incoming text - this is useful for capturing text files on BBS.

Gizmoz Calculators

There are three calculators included in the package, all of which have specific uses - programming, scientific and financial. All three calculators are a vast improvement on the calculator that is included on the Workbench disk the programming calculator is capable of running in an 8bit, 16bit or 32bit mode and has such functions such as XOR, AND, NOT and OR. The other two calculators have similar usefulness in their area of function.

Encrypter and Compressor

These two utilities are quite useful if your machine is being used by many people other than yourself. The Encrypter codes your files so that without a password it is impossible to decrypt them - this makes sure that your personal files remain that way.

AudioVisual Package

This drawer contains four programs that are not as useful as the other packages included on this disk but nonetheless are interesting to play around with. These include a cuckoo clock, announcer, graph-maker and a life simulator.

The *Gizmoz* package is a very useful tool, especially if you own a hard disk and want a real business environment to work with - not to mention a secretary that doesn't take sickies. The usefulness of this package however is not at its maximum without a hard disk, also it works a lot better with extra memory.

Distributed by OziSoft
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Hints and Tips

by Tim Strachan

Some tips for using Pagesetter

If you're a registered user of *Pagesetter*, ie, you've sent in the registration card which arrived with your program, then you can have Gold Disk's Newsletter sent to you. It's fairly informative, and has various tips for using the program, as well as news about what's coming up from them. To get a copy write to:

Gold Disk Inc, P.O. Box 789
Streetsville, Mississauga, Ontario L5M 2C2

Being a registered user should also allow you to upgrade to *Professional Page* when the finished version is released (see article on this in the September issue of *Australian Amiga Review*), something well worth doing.

The HP Laserjet Print Module should be available at any time now, and will let you output *Pagesetter* documents to the HP Laserjet using the internal text fonts at full 300 dots per inch (dpi) resolution. It includes screen versions of the HP fonts so that you get "WYSIWYG", or "What You See Is What You Get" at all times. A good alternative for those without access to a Postscript printer, such as an Apple Laserwriter Plus, since there are so many HP printer emulations around. Should sell for about \$70 here (US \$44.95).

The Hyphenation Module is also available direct from Gold Disk - it takes any *Pagesetter* document and embeds "soft hyphens" into all words in the document at appropriate places. So line breaks can occur at those points in the words, rather than moving the entire word to the next line, giving cleaner looking text. You can also fine tune the hyphenation done by the program if you wish. (US \$29.95).

Not mentioned in the manual:

- In the Text Editor, key F10 will toggle the insert/overwrite mode.
- Shift-UParrow and Shift-DOWNarrow will move up/down one screen at a time.

Goldspell Version 2, a spelling checker and corrector, is available for US\$44.95 from the address

above. It contains over 90,000 words and will also support *Pro-Write*, *VizaWrite*, *Textcraft Plus* and other Word Processors using IFF text format files.

Yet more hints and tips

Send in any hints and tips that you've come across so others can benefit from your wisdom.

Keyboard

● Some people may be unaware of the extent of the possibilities of the Amiga keyboard. In the DEVS directory of your 1.2 Workbench disk are several different KEYMAPS which can be changed through the CLI or through the SETMAP utility in the SYSTEM drawer. The default keymap which you're probably using is the USAO which is pretty standard and contains most characters that you need. But the other day, I had to prepare a document with a Pound Sterling character, but where was it? At ALT-L in fact, but not through my text editor - it appeared in *Pagesetter's* text editor however when I pressed that combination. In short, you'll find every character you ever needed if you look for it.

The best way to look is to get the program *SETKEY* (from Code-works, c/o Charles J. Carter, 4601 Wilshire Cove, Huntsville, AL 35816; send US\$25 & p. & p.), which is a neat utility which allows you to do two things - on a graphical representation of the keyboard you can click on any key, using any keymap, and find out what key-combinations are possible in that keymap; and, more powerfully, you can select any key and define for yourself a keymap with your own macros and assignments. So you can program F2 to be "diskcopy df0 : to df1:" if you like and a single press will do it.

"Keytoy" in The Tools drawer of your Extras disk also shows you the various key combinations available with the different keymaps.

A Demo version of the program can be found on *Fish 70*, along with a few custom keymaps. The SAVE function is disabled (to encourage you to buy the program), but you can use it to check out all the key combinations in your keymaps.

The *GIZMOZ* disk (see review this issue) has a HOTKEY function which allows you to do similar tricks in redefining keys, and you can do the same again with a couple of CLI SHELL PROGRAMS, such as METACOMCO SHELL, or Matt Dillon's CSH shell in the public domain (an excellent program).

For those who didn't read about shells on Megadisc 4, they are programs which "wrap around" the CLI, and give you extra capabilities, such as keeping a list of previous commands which can be retrieved by the arrow keys (history); command line editing, ie, you can retrieve a previous command and change it as you wish; and the ability to define macros for specific keys and key combinations (as described above). Well worth using one if you use the CLI much at all.

Speaking of key combinations - some may not know that to remove the contents of any "dialog box" in any requester (those strips where you have to enter the names of files), just click in the box, and then press Right-Amiga & X together. This will work for any requester and saves a lot of backspacing.

Some programs open windows which don't have "depth arrangement" gadgets in the top right corner (*Textcraft*, for example). To push the window to the back press Left-Amiga & N together; to reverse the process, Left-Amiga & M.

Running the Workbench - for beginners

All of the operations connected with using the mouse, menus, and icons are handled by the WB, and for some users, no more will ever be required. After mastering the techniques of the WB, however, you may find it interesting to go

further and explore the CLI or Command Line Interface as well.

A NOTE FOR THE

CAUTIOUS: Don't be! Nothing you do, short of taking a tomahawk to the machine, will destroy it, it's tough. So experiment as much as possible, try out the techniques described here as soon as you read about them. The main advice to heed is to avoid ejecting disks while the red disk light is on - this might trash your disk. Otherwise go for your life, try everything, life is short!

Icons

First and foremost, on the WB everything runs from ICONS, which is the graphic representing a program (or TOOL in WB terms) or a Directory (or DRAWER) or a DISK or a file (or PROJECT). An icon just gives you something to manipulate in some way: double-click on it to "open" it; single-click to "select" it; "drag" it with the mouse to move it to another place.

The icon is directly associated with the file it represents, in the sense that it contains instructions about it - where it is on the disk, how big it is, whether it needs another program to run it or show it (if it's a graphic, for example). It's quite possible for a file not to have an associated icon, in which case it exists all right, but you can't see it or manipulate it on the WB - you have to enter the CLI to do anything with it. Or you can attach an icon to it by using the ICON EDITOR (more on this later).

Workbench techniques

A. Opening an icon:

"Double-click" on the icon with the left mouse button. Similarly a DRAWER icon will open a window to display its contents; a PROJECT icon (like a Word-processing document) will call on the associated main program (Word-Processor in this case) to display itself; a TOOL icon will run the program associated with it (the Notepad, for example); and the

(Continued on page 12)

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AD	Adventure	U	Utility
H	Home	A	Art & Graphics
BU	Business	M	Music
ED	Education		

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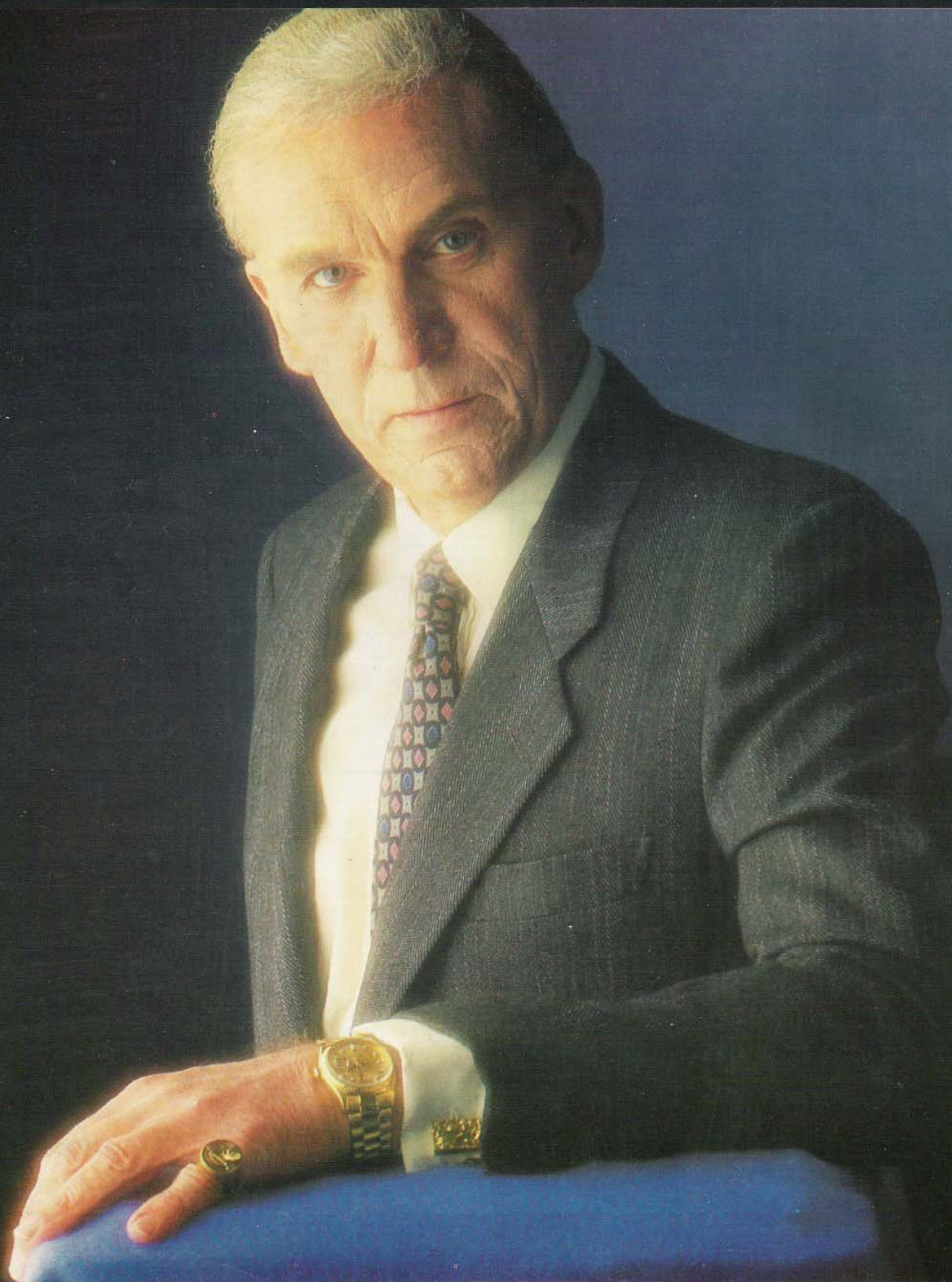
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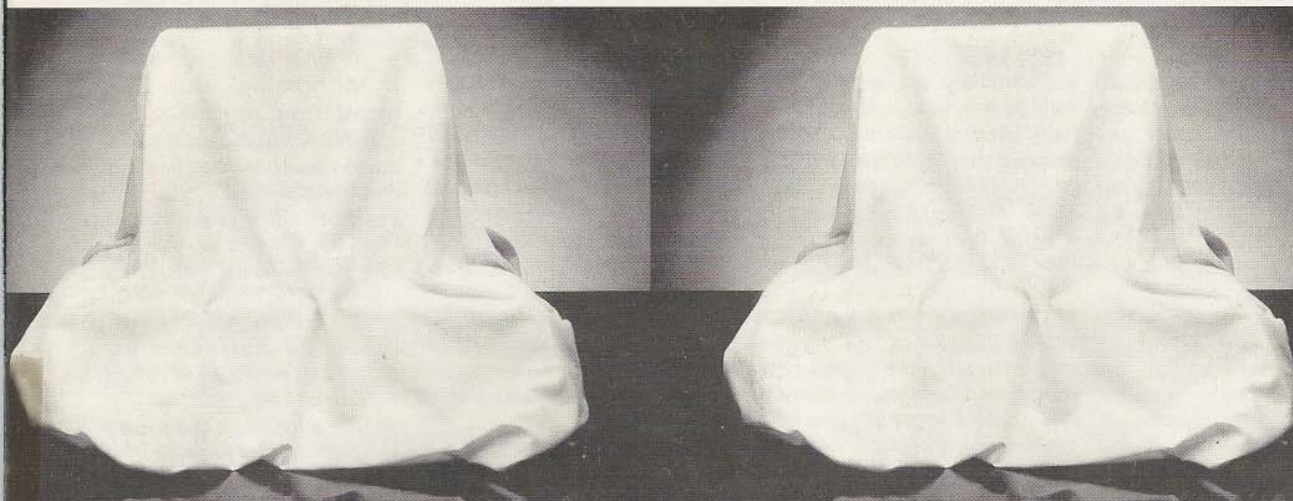
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TRASHCAN icon is just like a drawer except that you can drag icons over it, like any other drawer, and they will sit there until you give them the sentence of death by selecting "Empty Trash" from the DISK MENU.

B. Selecting an icon:

This is done by clicking once on an icon with the left mouse button, which will cause the icon to highlight or change colour. The point of this is to then go to the WB MENU bar, keep the right mouse button pressed down, move to one of the options (which will also be highlighted), and then release the button. This will perform the task you selected, such as RENAME or SNAPSHOT (see below).

* Note that sometimes some Menu items are "ghosted", rather than clearly outlined: this means that whatever you're doing at the moment doesn't need those operations.

TRY IT - select the icon for any file that you're reading, go up to the menu bar, keep the right mouse button down, move to the WORKBENCH menu at the far left and move the pointer down to RENAME. Let go of the button, and you'll see a thin rectangle appear with the name of the file in it - remove this name by pressing RIGHT-AMIGA (the right-hand red A button) and X together, and now type in a new name, say INTRODUCTION. Press RETURN, and you'll see the new name appear under the icon. It's worth noting here that the RIGHT-AMIGA-X combination will always remove the contents of any such REQUESTOR, so that you don't have to Backspace or Delete.

In the same way, instead of double-clicking on an icon to OPEN it, you could just as well SELECT it, then go to the WORKBENCH MENU item, and move to OPEN at the top of the list, and release the button. However, you'll probably find it easier to double-click.

C. Dragging an icon:

To move an icon, in order to tidy it up, or put it in another drawer or on another disk, simply position the pointer on it, hold down the left mouse button and then drag the mouse in the direction you want to go. When the icon is where you want it to be, let go the button and

that's where it will stay. ** You don't have to have a DRAWER or DISK window open to accept a dragged icon - you can drag the icon on top of the icon for a DRAWER or DISK and it is the same as dragging it into an open window. (See EXTENDED SELECTION below).

Note that if you dragged it to another disk, the original icon will still be there on your original disk, as well as a copy on the "Target" disk. If you dragged the icon from one place to another on the same disk, then it has been moved, not copied. If you just moved it within the drawer or window it was in, to straighten up its position for the sake of tidiness, you'll have to SNAPSHOT it if you want it to remain there the next time you open the drawer or window, as follows.

D. Snapshotting icons:

Select the icon, having dragged it into the position you want, go to the SPECIAL menu, and move down to SNAPSHOT. Release the button, the computer will whirr, and that's it. (See EXTENDED SELECTION below).

E. Deleting an icon:

There are two ways of doing this, by using the TRASHCAN, or by using DISCARD in the Workbench menu. To discard an icon, drag it over the icon for the TRASHCAN, and release the left mouse button. You can do this to as many icons as you like, and if you open the Trashcan icon you'll see them all sitting there waiting for your verdict. If you decide you definitely don't need them, select the EMPTY TRASH option in the SPECIAL menu, and all the contents of the Trashcan will be gone.

If you're more decisive, simply select the icon you want to banish, go to the DISCARD option in the WORKBENCH menu, and release the button. A REQUESTOR will appear which seems to question your judgement - click on the "OK TO DISCARD" box and that's the end of that icon. (See EXTENDED SELECTION below).

F. Duplicating an icon:

You may want to have two copies of a file on the same disk, in different drawers, or you may want to create another DRAWER for purposes of disk reorganization. So select the icon you want to duplicate, and select the WORKBENCH DUPLICATE op-

tion, and soon you'll see the same icon with "Copy of . . ." as its name. You might want to RENAME this to the same original name, or if you duplicated the EMPTY drawer you might want to rename it to "MyDocuments" or whatever.

TRY IT - Go to the window of your Workbench disk, select the EMPTY drawer, and select DUPLICATE from the Menu bar. If you don't need it right now, select it again, and go to the DISCARD menu option.

ABOUT GADGETS

**If you can't see the window you need on screen, because it's behind other windows, just click on the BACK/Front GADGETS in the top right of whatever window happens to be in front. The inner of the two will cause the current window to move to the back of the stack, while the outer one will bring it to the front. The other way of moving things round the screen, is to use the RESIZE gadget at the bottom right of any window - place the pointer on it, keep the left mouse button down and drag the window to the size you want it. Then just release the button. The third main window gadget is the CLOSE gadget in the top left corner of most windows or programs - click once on it, and presto! no more window.

G. Copying a disk:

Like most operations on the Amiga, this is a tedious process if you don't have an extra disk drive. However, in either case simply select the DISK icon which you want to copy, then select the DUPLICATE option in the menu bar. A requestor will appear telling you what to do next, and in the case of one drive you'll be presented with other requestors asking you to swap disks (SOURCE and DESTINATION disks) several times as the Amiga loads sections of the SOURCE into memory then dumps it to the DESTINATION disk.

The other method is to load your blank disk so that the icon appears on screen (saying DF1:BAD, or DFO:BAD for one drive), then drag the DISK icon of the disk you want to copy on top of the icon for the DESTINATION or TARGET or blank disk. Once again, requestors will tell you what to do.

H. Initialising or formatting a disk

This is the process of turning a brand new blank disk into a disk that is recognised by the Amiga. The procedure is similar to doing a DiskCopy - select the icon of the new disk, go to the menu bar and select INITIALISE from the DISK menu, and the machine will go through its paces. Once it's finished you may want to rename it for your own purpose.

As an initialised disk is ready to take data, so you might use it as a disk to hold all your Word Processing icons, or to store your *Deluxe Paint* graphics on, or whatever. Just drag them across from wherever they are, and you might also drag an EMPTY drawer across from your Workbench, so that you can duplicate it on the new disk and create a series of your own drawers.

ABOUT EXTENDED SELECTION

Sometimes you may want to copy a number of icons from one place to another together, rather than one after another; or you may want to discard several at once; or snapshot a whole drawer-full once you've arranged it as you like it. In such cases, there is a simple way to do it.

With the SHIFT KEY pressed down, click once on each of the icons you want to copy, discard or snapshot. When you've done that, they'll all be highlighted. Now take your finger off the SHIFT key, and go to the appropriate selection in the Menu Bar as usual and select it (this is for DISCARD and SNAPSHOT, not COPY). The computer will whirr, and it'll be done.

In the case of COPYING several at once, select them all with the SHIFT key down, then drag the pointer to the drawer or window you want them to be copied to. You'll see them all move together. Release the mouse button when they're where you want them to be. This is a technique which saves a bit of time, especially in the case of SNAPSHOTTING. Just be a little careful with the DISCARD . . .

If you want to find more information about using the Workbench or CLI, you'll find plenty of information on MEGADISK, a magazine-on-disk for the Amiga. Look for the advertisement in this issue.

Games Galore at Bruining Headlam

Stuart Nicholson updates the game situation

This month your regular Amiga writer is taking a well earned break and I am filling in for him. Do you have yearnings to be the next Walt Disney? Now there are no less than two programs on the market that will put you on the road to being the next cartoon animator. One is called *Apprentice Animator*, and for the more ambitious, the other is *Page Flipper*.

Using either *Deluxe Paint* or *Digi Paint* you can produce some very professional little animations. Remember the old stick man drawn on pages of a school exercise book and then flipped through to give the impression of animation? Well, this is the same principal. After a little experimenting some very clever cartoons are possible. So if you want to do more with

your paint program than draw pretty pictures, grab hold of a flipper program and bring your art to life.

Now for all you budding owners, or would be owners, of Amiga computers who want to get in to some great games here are some titles to tempt you. Some are available and some are just round the corner. But be prepared to have some very envious friends. Don't waste money in the Arcades because with the Amiga the arcade is coming into your home. Did you know that two of America's top Arcade Game manufacturers are using Amiga boards for the Arcade machines? We will see these games available for our home Amigas very soon.

Terrorpods is now available. This is the latest game from Psygnosis, the company who brought you *Barbarian*. Their games are all original. This one puts you in charge of finding the *Terrorpods* construction blueprints and then destroying them. Amazing graphics combined with strategy and arcade sequences make this a sure-fire winner.

Firepower, a one on one tank battle game or play against the computer, is another arcade game just released. This one has an added feature that if you have a friend with a modem you can play against each other over the phone. This is a must for arcade players. If strategy is more your thing then *Kampfgruppe*, a Russian Front WWII simulation, should be looked at. This one, by SSI, is the best strategy game yet available. The graphics are excellent and take full advantage of the Amiga's capabilities.

Garrison is just around the corner. Any self-respecting Arcade player will have heard of or seen *Gauntlet* in their local arcade and this is an exact duplicate of that game. It will be a must for anyone who likes *Gauntlet*. *Test Drive* is also nearly here. This puts you in a road race and you can choose your car. How about a Porsche? Or maybe you see yourself throwing a bright red Ferrari roadster around country roads. But watch out for the Highway Patrol because they will book you... "If they can catch you".

Another top game out now is *MouseTrap*. This is an excellent platform game with no less than forty screens to solve before the dapper Mr. Mouse finds his true love. Finish it and the ending is quite a surprise. For the Adults a tongue in cheek adult graphics adventure game from the makers of the *Kings Quest* series called *Land of the Lounge Lizards*. You play Larry the ageing Gigolo on a night on the tiles. Very funny and a little bit naughty. Worth a look at.

One final bit of information that started as a rumour and now seems about to be released and that is an Atari ST Emulator. This would allow you to load and run ST software thus giving Amiga owners a larger choice of software.

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Tips on Digitizing

What makes for a better picture? These few simple tips will help you make the most of your Amiga and Digiview.

CAMERA

Digiview now makes use of colour video cameras, but the best results are still obtained using a black and white camera. These are used extensively in security applications, and so are relatively easy to obtain.

The camera must be 2:1 interlace (not random sync) for correct operation. Better cameras will have from 600 to 800 lines of HORIZONTAL resolution - don't confuse this with the 525 scan lines which is the Australian standard. The extra investment in getting a higher resolution camera will pay dividends in the final results.

Another important factor is the signal to noise ratio - which should be as high as possible. Noise is evident as "snow" in the digitised image, and is made worse by low

light levels and in dark areas.

SUBJECT

Unless you are trying to create some special effects, use a photo to digitise from. Avoid pictures which are out of focus or blurred in some way. High contrast shots with clean sharp images give the best results.

When preparing pictures for use in other packages such as *DeLuxe Paint* you will be using a palette of, say, 32 colours. On digitising the picture, the software must choose the best possible choices of colour it can out of the 32 possibilities. To allow the software to make the best choice, eliminate any unwanted colours by eliminating unwanted sections of the picture. The best way of doing this is to cover these areas (or borders) with some black cardboard. The results of this technique become obvious when digitising flesh tones, as the greater range of tonal variation in the skin gives the final re-

sult a much greater "picture" feel.

LIGHTING

Adequate lighting is essential to good results. A copy stand with two or four photographic lamps is recommended to give an even spread of light over the picture.

Having a single lamp or non-photographic type lamps will cause a graduation of light across the image (which also uses up colours when not in HAM mode). Video cameras operate better when there is plenty of light.

A good guide to lighting is to check the histogram produced by *Digiview*. Optimum results are obtained when the "RAW DATA" and the "ADJUSTED DATA" histograms are as similar as possible. Exact correlation is usually not possible due to the subject matter itself, but the effect of good lighting can be seen in the histogram - and the final picture!

EXPERIMENT

Digiview allows you to adjust the colour levels of your picture, as well as Brightness, Contrast, Saturation and Sharpness. Don't be afraid to experiment, as you can always return the settings to

the centralised position, and you won't affect your data.

It is wise to make small adjustments of the controls and see the effect on the specific picture. It is worth spending some time with these controls.

APPLICATIONS

As well as the obvious applications of printing out your pictures, *Digiview* can also be made use of in a variety of applications such as advertising, education and in databases.

An interesting application we recently heard of was in Real Estate. A home for sale was recorded through red, green and blue filters on a portable video recorder. The recording then being digitised, and the picture transferred to *DeLuxe Paint* for the addition of explanatory text, and then displayed in a "slide show" for prospective buyers.

The quality and usefulness of *Digiview* is in your hands...

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up the latest gossip getting around Sydney and the USA.

Only at a computer Utopia would you find a full range of Amiga computers, Epson printers, masses of the hottest software ever conceived and just about every peripheral from video digitisers to fully smart Hayes compatible modems, even the elusive 22 and

33 meg hard disk drives.

Already the MicroComputer Spot has been instrumental in setting up the Amiga User Group. Their latest project is a Bulletin Board Service where, once again, users and hackers alike can download the latest software reviews, public domain software, even commercial software demos all from the comfort of your lounge room. The system is running on an Amiga 1000, 33 meg C Ltd hard disk and a couple of meg of ram.

Part of the policy of MicroComputer Spot is to ensure

that the very latest software is always in stock, regardless of how often the branch managers must call OziSoft, ECP or even the USA.

But without any doubt the most stunning feature about MicroComputer Spot is its staffing. Every staff member has their own expertise. Sure all of them have a very broad general knowledge, but when it comes down to that really niggling problem you have with your printer (or modem or disk drive or . . . or etc) you can be assured of help, it's only a stroll away.

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Terrorpods

by Tristan Mason

Terrorpods is yet another slick and refined game by Psygnosis, the software house that has brought you such fine games as *Brataccas* and more recently the excellent adventure game *Barbarian*.

With such a fine track record I was eager to load and play *Terrorpods* and proceeded to do so on the Amiga 2000. The game loaded as per usual but unfortunately due to the memory and/or the keyboard configuration I was not able to use all the functions of the game. Frustration set in.

Once loaded on the Amiga 1000, the screen came to life with a smoothly animated scene of a pilot entering his Terrorpod. All praise to Psygnosis for their excellent opening graphics and animated sequences.

After selecting my nationality, English of course, I was inside my D.S.V. (Defence Strategy Vehicle). The view from my D.S.V. is of the planet Colian and I am in a large grey and black mottled crater with many and varied installations surrounding me, while looming over head is the mother ship of the Terrorpods.

What am I doing here? Colian was once a Federation mining asteroid rich in mineral deposits. These minerals, Detonite, a powerful explosive, Quaza, an energy

crystal, Zenite, a magnetic ore and Aluma, an indestructible metal, were ideal for the manufacturing of weapons.

The federation established ten mining colonies on Colian, each with its own resources, and these were connected by a system of shuttles to distribute the minerals. The interdependent colonies were then used by the military to make weapons and a defence and surveillance system was set up to protect the whole operation.

Then came the Empire. (Sounds familiar). With the Mother ship set in orbit around Colian the Empire set about destroying the defence system and taking over the mining operation to manufacture their secret weapon the Terrorpod which would be used for conquering the universe.

My mission is to obtain the components of the Terrorpod and discover its secret of its manufacture. Who, me?

After being hit by a missile from the mothership, I decided to look around and try to make contact with one of the colonies. While looking around the crater and surveying the various installations I launched my drover, a small droid with which you make contact with the installations. Once contact has been made you must barter or trade in various resources and in

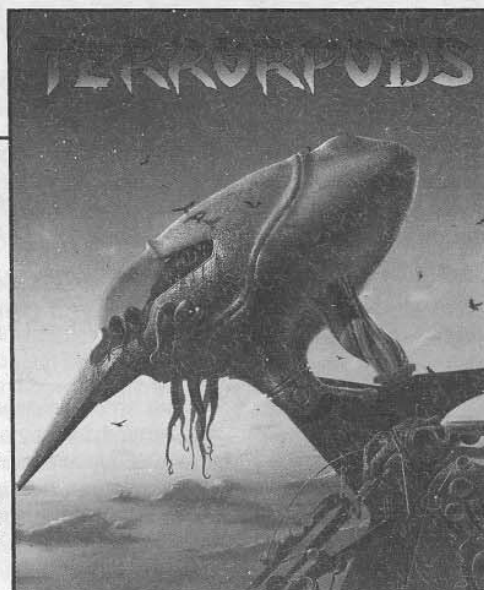
doing so hope to come across a component of a Terrorpod.

I traded some Zenite for some Fuel Rods but did not find the elusive component and recalled the drover. I then referred to the map to see my position in the crater and moved on.

Terrorpods had landed!

While I had been totally absorbed with the process of trading, the mothership had sent down some Terrorpods to investigate my activities and they weren't in a friendly mood - and neither was the mothership as it hurled another missile at my D.S.V.

Switching to Weapons mode I evaded the missile bearing down on me and turned my attention to the Terrorpod as it applied the scorched earth policy to a shuttle and then to one of the distribution installations. I primed the warhead of one of my missiles with detonite and commenced the launch sequence. The sighting window dropped down and I located the



Terrorpod in the sighting markers, then fired. Firing is one thing but keeping the missile on course is another, and I missed the Terrorpod altogether.

Zap!! Another hit on my D.S.V. Three more and my mission will be over.

Great graphics and game plan make *Terrorpods* a must for your game collection, although the instructions leave a bit to be desired, and there is yet another great Roger Dean poster to pin up. I rate this one a 9.

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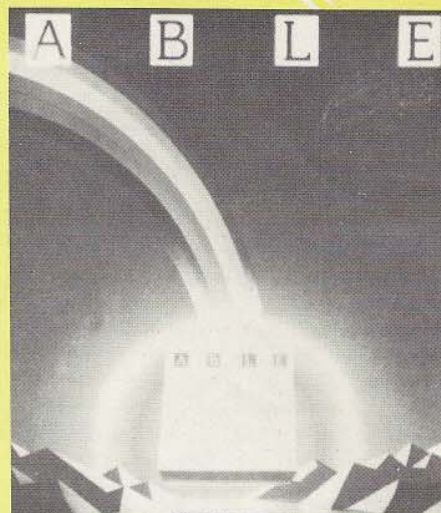
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Commodore Magazine, (US) Sep'87
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Amiga World, (US) Aug' 87
Reviewer: Ted Salamone

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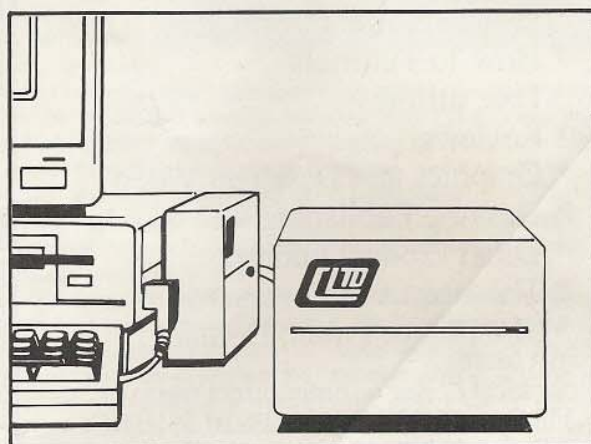
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Pirates

(The Game)

No, this is not another article about the folly of copying software. It is a review of a game about the real pirates of yesteryear.

BOTH EDUCATIONAL and entertaining, *Pirates* is a true real-life simulation from software company, Microprose.

A swashbuckling simulation that takes you sailing around the Caribbean Sea in search of wealth, fame, and fortune. The strategy you chose will decide whether you end up in a Spanish prison,

simulation, I found that the time spent reading the finer details was not wasted.

A new Career

First choice of the day is to start a new career. You can continue with a SAVED game or play a famous scenario, or start a fresh. Next you choose the historical period, or none to start from a random time. Then choose your nationality. This is an important option. Where you're from makes a big difference on who you can trade with, and the attitudes of others toward you.

Enter a family name, special skill (fencing is a good start) and you're ready to play . . . almost. First, you must answer a question about the Treasure Fleet, or Silver Train. For this you will need the manual handy. It's not too tricky to find the answer, but this certainly is yet another attempt to curb piracy of the other kind.

The screen displays each prompt in a window which appears offset, although slightly overlapping the previous window if any. The effect is easy to follow, and helps you to understand how the game works and remember where you are.

Choosing between options is carried out using the joystick and button, and the help of a screen pointer in the shape of a quill. A bit slow at times, but easy to do.

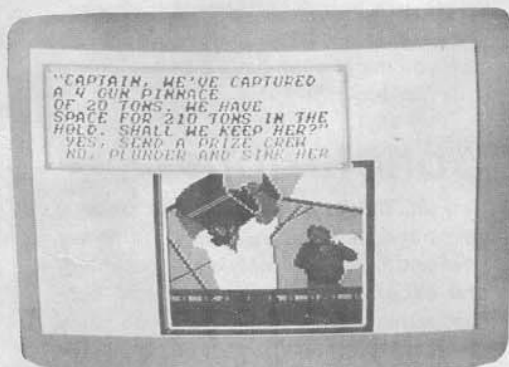
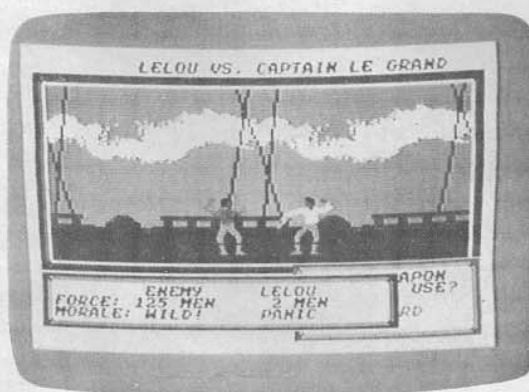
There are many different aspects to the game, and a variety of ways to achieve your goals. Forming a relationship

with various governors is a big help. They may charge you to do a job, and later reward you for completing it. Each town has a merchant and tavern which may provide opportunity to trade and build your crew respectively.

Visit the wrong town and you may find yourself under attack. Each port is named on the map, however it's up to you to establish just who occupies what at your time period. It's possible to sneak into port, for information, or to just plain old sail in and march up the main street - a good idea when you return to a friendly land. Other ports may call for more drastic action.

A raid from the sea, with a barrage of cannon fire, or maybe tiptoe around to the back entrance and attack by land. These are violent times, which would have no doubt been rough to live in. Gold and silver held great value, and frequent raids on ships and land convoys were not unheard of.

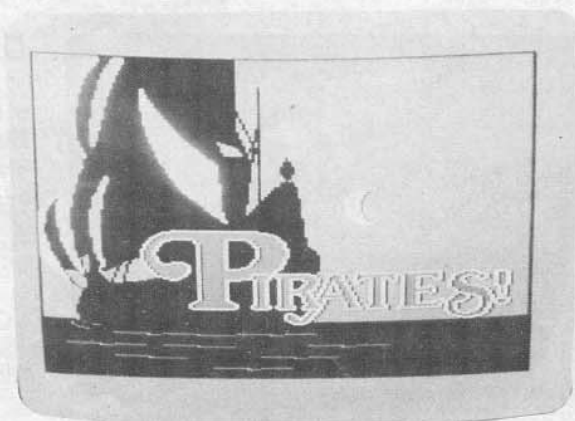
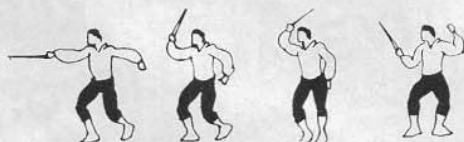
Without getting too carried away with

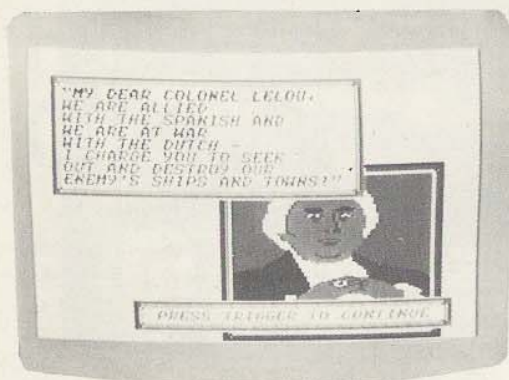


or married to the daughter of a British governor. You can rely on trade or be a bit more daring and take to the powder and keg.

Inside the package you'll find a floppy floppy and map of the Spanish Main, from 1560 to 1700. This is a time period of massive upheaval within this area. From the Silver Empire to Pirate's Sunset, the rise and fall of Spanish military superiority, and the very heyday of buccaneering.

Getting started is a fairly simple matter. The manual even includes a two page guide to playing without reading the rest of the manual. However, as with any good





blowing up other people's towns, you can still make a small fortune treasure hunting. Occasionally a tavern may be a good source of information, only to glad to sell you a map.

At sea

Once you're in the big blue yonder, the joystick controls movement, and the right angle of attack is necessary to gain the best speed. Watch for cross winds, and currents too. The display is a top on map view, moving one screen character at a time. A bit jerky, but acceptable. Graphics are just all right, but more than good for a simulation.

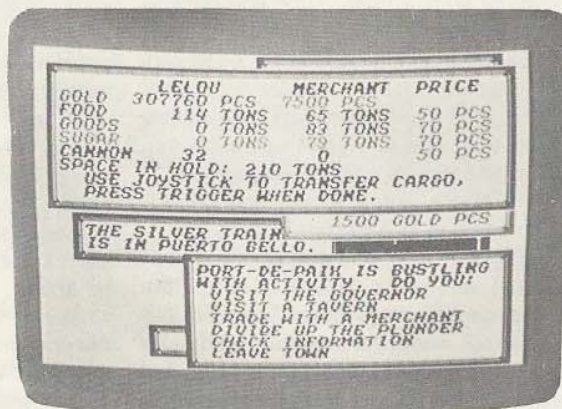
Most of all, beware of other ships. On encounter you can investigate their credentials at long and medium range. If friendly; pass by for news, or if the ene-

my, draw alongside with cannons blasting and storm the ship.

Such activity still takes place in today's modern world, with machine-guns and rocket launchers. However, by comparison these were gentleman, who used the cutlass, long sword and rapier.

It is this part of the game that can be the key to many a successful expedition. A full animated sword fight with a variety of manoeuvres. The scene takes place either on ship, in a fort, or within a town depending on the situation.

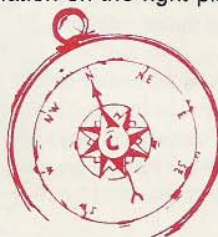
Strikes to the body reduce your morale, and that of your crew. If things get really tight, you can back off and run away - a tactic that is often a wise move.



Animation is not brilliant, but sufficient to portray the actions involved. Sound is sadly lacking, with the occasionally crunching noise - perhaps the Amiga version will be better.

Documentation

The manual is excellent, one of the best. It tells all you need to know to give a real feel for the era, as well as providing the right information on the right place on



how to play. Only one thing found me a little confused. At the start you are told that your family was lost from you, by one means or another.

During the game the option may arise to locate your sister, by means of a map. Little is said about this in the booklet, and I'm still unsure of just how to locate her using the map provided. Treasure I have found by map, but not my sister.

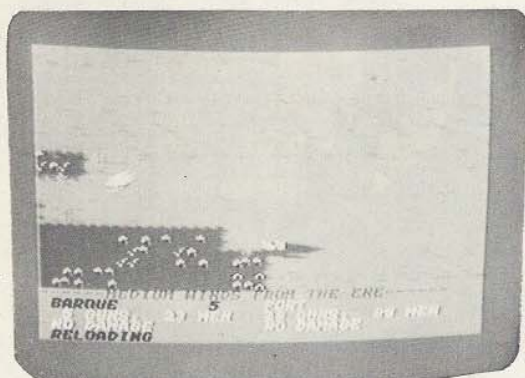
Historically, *Pirates* could be viewed as educational. Much is said regarding the major events of the day. The game gives you the chance to be a part of the action, in whatever quarter you choose. If ever you get stranded in the Caribbean, you might even have a better idea of your way around!

Conclusions

Fun, but furious? Well, the pace is calm, and action sure gets a bit heavy now and then. Certainly well presented, and excellent documentation and concept within the game. Whether you fancy being a pirate is up to you, but after several years at sea, the thrill soon wears off. Nevertheless, for some, this will be an appealing program. It's a little in the vein of *Seven Cities of Gold*, but more complex. As far as simulations go, this one is one of the best. □

Pirates

Publisher	Microprose
Distributor	Various
Price	n/a
Machine	C64/128, Amiga
	soon
Graphics	84
Sound	68
Music	54
Presentation	93
Simulation	96
Overall	92



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BOULDERDASH II

Rockford's Revenge

by J. Mark Hunter

JEWELS, RIPENED into sparkling mineral deposits. The sound of the giant machinery noisily keeping busy down below, biting farther and farther into the earth, searching, scanning the walls for the magic within.

When they get it, it's after a long, long tough time, and for the owners, success is sweet.

Boulderdash, circa last quarter 1986. A computer game based on digging for jewels in the Earth and getting away from living things already present who consider such entities as theirs.

Now, son of Rockford, *Boulderdash II*. Into the wonderful world of animation. Computers bringing to life the colour, the brilliance, the vibrant riches of the characters in front of the pen and behind the screen. Actually, *Boulderdash* was originally copyrighted in '84, but hadn't been reviewed by this magazine until December of '86. But the new edition is birthmarked '87 and we got it fresh to you as of now!

Peter Liepa did a dynamite job on the first one and this time around he's equalled it, though not excelled it. It's good, but not that terrific. But let's dash inside and take a look. Let's stay inside, because you'll have too much fun to want to leave.

We've got our same friend here, Rockford. He's the star of the game and we'll be with him for the duration of the program. Between the two, *Boulderdash* and *Boulderdash II*, there is not a lot of difference. The sequel has just been souped up with extra unfriendlies and relies more on what you learnt last descent into the face of the mine.

The objective is to search throughout each cave and collect as many jewels in as short a time as possible. Once the indicated amount of jewels are collected, the door to the mysterious escape tunnel

is revealed to you and you go on to the next level.

What actually gets you to that level though? Well, Rockford starts off at the beginning of his journey in the first cave of the program. There are 16 caves by the various methods presented to find the jewel of the cave before the timer runs out. Though there are many things to hinder your progress.

I still have not figured out what race Rockford is, but it's not human. He's sort of a Cabbage Patch Scarecrow, a cross between Freddo the Frog and John Howard. He wears sneakers, white sailor pants, and a red and white striped T-shirt. His face is orange. They don't reveal it, but it's been leaked that his elbows are canary yellow.

He's a friendly guy, but though he has no enemies through personal affront, there are nasty somethings within the cave walls that don't like him there messing with the soil and the baubles hidden inside.

Bonus tries

You start with three chances of success per game. Bonus tries are awarded every 500 points, and as Rockford tunnels his way to the different caves these will shimmer and again, bonuses are presented.

The current point value is shown on the top left of the play screen, to the right of the picture of the jewel. The number of points per jewel change as they are determined by the type of cave, difficulty level and bonus status. The bonus value occurs after the required number of jewels have been collected. Every 500 points, the tunnels sparkle for a moment and you get another Rockford. You also



score one bonus point for each second of time remaining when you exit a cave. This is a great system, providing an excellent incentive almost every phase of the game.

The game is totally controlled by joystick and trigger button, or a keyboard can be used separately. With the joystick you direct Rockford on his eager mole through the ground. He has the power to move massive boulders that get in his way and stand underneath such without suffering the crush effect.

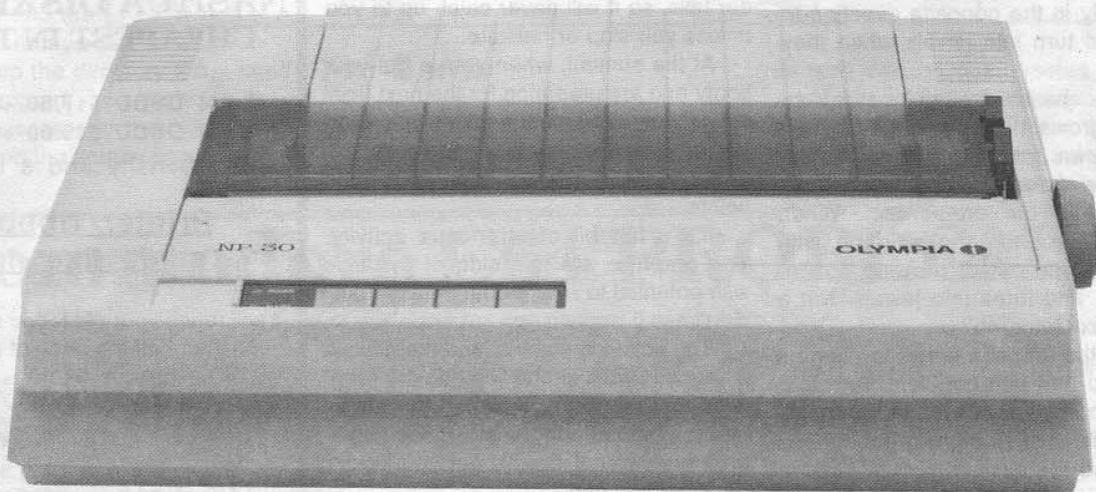
The boulders are the main hazard of the play, as they stand between R. Ford and the entrance to the cave, block tunnels, and hide the location of the jewels inside the caves.

As for the jewels themselves, you must collect the required number of gleaming diamonds in order to exit one cave and advance to the next. In addition to collecting jewels you can create them. For example, transforming the underground butterflies, suffocating amoebas, or dropping boulders through an enchanted wall. When the proper number of jewels have been collected a flash will let you know the escape door is revealed and open.

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Fireflies

What exactly are these strange insect formations competing for screen attention? Some of them are fireflies. They glide about the tunnel Rockfish is using for freeway travel. Their behaviour is predictable, moving along the edges of the exposed areas and exploding on contact with Rockford. And that's a big bye-bye to everyone involved.

So the way to beat them is by dropping boulders on them so they blow up, and if you want to harness the energy from the force of the blast make sure that when you go for the drop it's near a wall that you want to demolish in order to get another jewel.

Butterflies are pretty much as volatile. They fly in the opposite direction to fireflies and turn into jewels when they explode.

The amoeba is a green blob that bubbles and grows through earth and air. Rockford can touch it without harm, whereas the aforementioned bugs will eat dynamite and die on contact. When Rockford surrounds the amoeba with boulders it runs out of growing space, suffocates, and turns into jewels. Not a bad jewel extractor, eh?

Yet, if the amoeba grows too large it will die and turn into boulders. And that was not too enjoyable, I found, when, after a hard hour or so digging through the stuff I found the assified sludge parking at the entrance of a cave and shutting up my burrows. It's disheartening, but you're having too much fun to quit, so roll up the sleeves again and start digging all over.

Variations then in certain monstrosities are differences in entering and exiting certain caves and methods of collecting the required treasures. The routine does not change, but the enterprising hurdling of these upgraded and more sophisticated potholes to success are both enjoyable and challenging.

Enchanted wall

Then there was mention of an enchanted wall. Looks like every other wall in the game but when hit by a falling boulder it begins to vibrate for a limited time, and during this period any boulders that drop through it are magically turned into jewels. Once the enchanted phase is complete it cannot be reactivated in the

same round. Let's not get greedy. We've all got to work for a living.

Another thing to remember in the game is that Rockford can affect an object that is next to him without moving into it. You keep the joystick button depressed and move the joystick in the direction of the object you wish to affect. Rockford won't move, but the object will react.

And when it comes to boulders, you will often find yourself digging or moving downwards only to find that a boulder has been toppled by your movement and is about to fall on you. The only way to avoid losing your man is to move quickly to the right or left out of the boulder's way. Rockford runs as fast as the boulder falls, so it will never catch up to you unless you stop or hesitate.

At the summit, when you've got your booty and are preparing for the next flight out of there, you must decide whether to go for jewels of a higher value or exit through the revealed door for bonus points.

It's a fun bit of strenuous activity. The graphics are this side of dynamic with potential to even equal the first, but I didn't see it happening.

The action is electric, and the difficulty rugged. Don't let the "Freddo the Frog" alias fool you here, because the guy is one tough toad and the situations he exercises does not exactly get you kicking back on a lily pad.

Revamped and resubmitted to the public, *Boulderdash II* is a good buy if you do not already have *Boulderdash* the first. It'd be kind of like trading in your '86 model Turbo Telstar for an '87 one because the ashtray in the new one stubbed your butts out for you. *Boulderdash* was an arcade classic, is an arcade classic, videoed to the home market and excelling itself there at the time, and what you see in this sequel is just a way of reheating what's left in the refrigerator.

But it's good. That's undeniable. It is one of my personal favourites due to its teasing action and glittering end results. The diamonds we all wish could be our best friend.

It comes in a double pack with *Spy II* for \$14.95 for both. Very good value. □

Boulderdash II

Publisher	First Star Software
Distributor	Ozisoft
Machine	C64
Price	\$14.95 for C or D in double pack with <i>Spy II</i>
Graphics	79
Sound	69
Music	72
Presentation	75
Overall	80

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Bubble Bobble

by Eric Holroyd

Bubble Bobble is without a doubt the best arcade game for the Commodore 64 that I've seen for a long time.

IT'S AN excellent conversion by Software Creations for the C64 from the Taito coin-op arcade game and it's basically a platform game coupled with fast and furious shoot-em-up action. Definitely one for the hard-core arcade addicts!

It has a very catchy soundtrack which plays continuously whilst you're busy guiding your joystick-controlled creature as he bounces and jumps through the various screens in 100 different levels of action, each one more difficult than the last.

It's a game for a single player against the computer or two players can team together, one controlling Bub, the other one Bob. These two are different colours to enable you to tell them apart, very necessary as the action is too fast to ask for names! I had a great time in single player mode, playing for over four and a half hours for my very first session.

What you have to do is work your way through the aforesaid 100 levels in search of your girlfriend (I knew the birds and bees would get into computer games eventually!) All the while you're battling these horrible red nasties who just want to make contact with you. One touch and you're dead so avoid them at all costs. Watch out for the head nasty, Baron von Blubba, if you meet up with him there is no escape. To get rid of the bad guys you blow bubbles at them by pressing the fire-button. If you hit them they'll turn into large bubbles with faces and will float to the top of the screen. Chase them and gobble them up just by touching, but do it fairly quickly or they'll revert to their for-

mer horrible selves and come after you again.

If you do eat them a little blue and white "ghost" of the nasty will appear and spin itself to oblivion, falling at random somewhere on the playscreen then turning into a prize of fruit, cakes or other such delicacies.

You can grab these prizes for extra points as well as the large variety of similar prizes that just appear at any time. Be

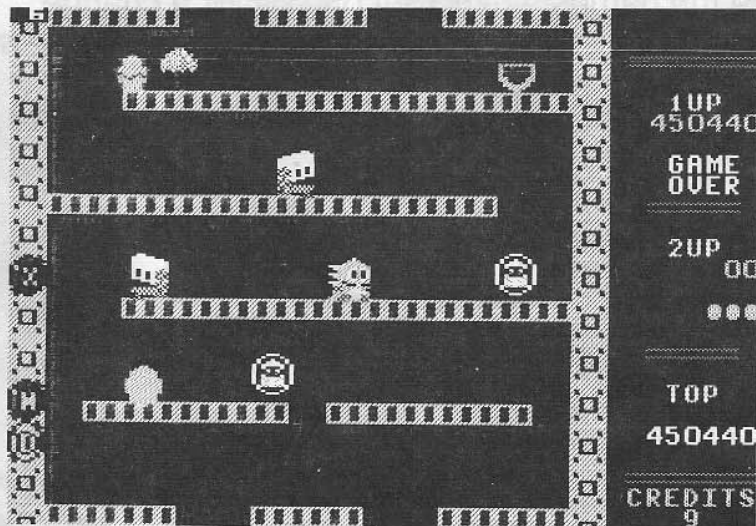
Grab as many of these as you can before the time limit expires, then you'll get a display showing how you went with the bonus score before the action starts up again.

At any time during the game-play you're liable to suddenly get a message that says "Hurry Up!". Everything then speeds up to lunatic pace and you dash around even more frantically and so do the nasties. You can score high points

during this bit so keep moving. Don't forget that on a lot of the screens you can exit at the top and re-appear at the bottom (or vice-versa), which can be very helpful in your efforts at life-preserving. Just when you think you've got the monsters worked out you'll be confronted with a new type which behave differently.

Bubble Bobble certainly keeps you on your toes with the variety of things that happen and the need to solve screen puzzles quickly whilst

trying to hold on to dear life. Strange things happen when you eat some of the objects which appear. If you eat the lightning flash all the remaining enemies on screen are killed and you progress to the next screen. One of the prizes I discovered will warp you to a screen up ahead when eaten. Eat the clock and you can scoot around the screen much quicker than the baddies as they apparently can't see when the screen turns to night-time. One of the secret weapons which you pick up will also give you tremendous speed to whizz around the screen whilst the other lot stay at the



sure to grab the extra large cake, diamond or any extra large prize as it's sure to mean extra points

Secret weapons, too, will randomly appear and you need to be quick (again!) to pick these up to use against the nasties. Further points are gained in *Bubble Bobble* by gobbling green bubbles, also by eating the floating bubbles with letters on them which score quite highly. In addition there are bonus points to be accumulated when the top of the screen turns into bonus-grabbing time and comes up with three rows of prizes like red arches or things that look like pineapple rings.

same speed. Play the game and find out which one for yourself!

There's a lot of finding out for yourself in this game as the instructions are just a few lines on the back of the pack. The rest is up to you and it's a lot of fun finding out what it all does. I can imagine that there'll be lots of letters to our illustrious Editor giving helpful hints and tips about *Bubble Bobble*! Seriously, if you do write in, tell us your High Scores and what level you got to.

My humble effort after the first four hours of game play was 128, 930 and Level 07. The high score table at the end of the game tells you what the highest score is for the current session, also

what you achieved in this last game and what level you reached.

I'll be doing better in the next session so watch out!

I do wish they'd put a high-score feature in the game to write the best scores to disk, as I could then have bragged for a little while, at least until all you real hot-shots got into it. There's much much more in this fascinating game and I recommend very strongly that you rush out and buy it. It'll hold your attention for a long time to come as it gets very hard the more you progress into it. It's a great game and ranks with my personal all-time greats like *Boulderdash*, *Mr Do*, *Bounty Bob*, *Monty*, *Manic Miner*, *Oil's Well* etc.

Graphics and music in *Bubble Bobble* are very much in the classic arcade style of *Mr Do*, in fact the nasties look a bit like escapees from that superb game to which I was introduced back in 1985 and which I'm still playing a lot. (Personal best is 1,576,350 and screen 67). I'll be alternating it now with *Bubble Bobble* however as I can see more potential fun in this new one. Do yourself a favour and get it soon but be warned, it's seriously addictive!

Bubble Bobble is distributed by Computermate Products and is available on disk, at a recommended retail price of \$44.00, from your favourite computer shop. □

Arena

So very good to see the games getting out of orbit for a change.

HERE WE are on planet Earth and nobody's shooting anyone, no crime committed, no foreign exchange. No alien invasion, we're still on planet Earth and we're having fun without getting hostile.

We're in the *Arena*. No lions, no Christians, just U.N. jocks doin' their stuff for the mother and fatherlands.

Arena, the class sports simulation we're told. Depicted: humour, competition and multi-player rivalry. The manufacturer: Psygnosis.

Anyway, Psygnosis tells me that the graphics on *Arena* are of, and I quote: unsurpassed realism. End of quote.

We'll debate that later, y'all.

But into the arena now, becoming an athlete and going for it to win. Six tough events, the 100 metre, pole vault, high jump, long jump, shot put and javelin. Points are awarded as in a decaffeinated event . . . I'm sorry, I'll just read that again, a decathlon event.

The images portrayed on the cover - momentary pause for all those of you that might happen to be loitering around in a David Jones video department . . . are true screen images. We'll get one printed up for this review. And why is this so? It's the 68000 man, the power, the quality that only Amiga can tease us with.

The graphics, I won't debate the un-

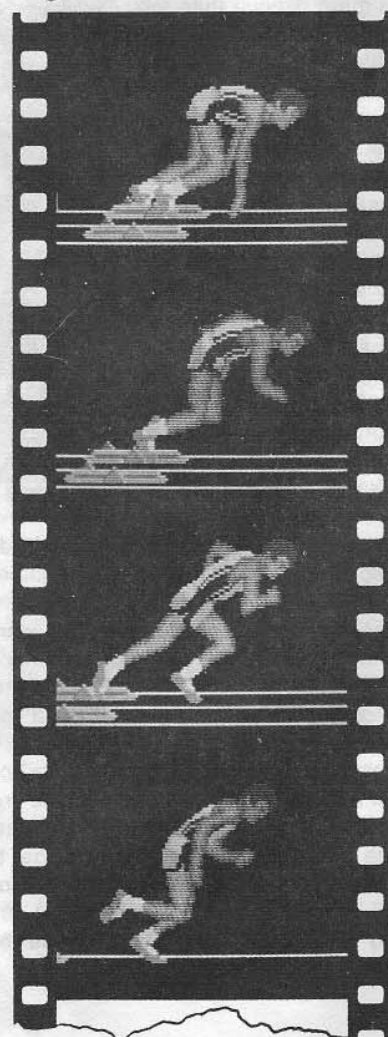
surpassed realism of them because we are in the state of Amiga here and everything is bigger and better in Amiga. According to Amiga standards they're 'good'. However, the concept of the game lacks that eager dynamics that get you so involved that you can't help yourself. The movements get a tad sluggish and not exactly co-ordinated to the control of a sportsman, an athlete of Olympic Arena quality.

But this is refreshment, this is so wonderful to be pushing the fire button for something other than firing.

Arena is an Event itself and rates a silver. Thirty pieces, or the equivalent of four man-eating lions. □

Arena

Distributor	OziSoft
Price	\$39.95
Machine	Amiga
Graphics	92
Sound	79
Presentation	86
Documentation	84
Playability	66
Overall	81



Don't miss out on these great bargains!

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Pi R Squared



by J. Mark Hunter

WHOA! Thank goodness it's not a game about mathematics or entertainment would have taken an all new dive to disaster! We want games with good animation, funny characters, laughable music. Working out equations according to which way the wind blows doesn't count as shooting the breeze. On this computer anyway.

No, what *Pi R Squared* does for you is set you into a multi-level arcade. Each level is a series of wheels around which the character travels in order to collect a number of objects while at the same time avoiding the uncomplimentary chasers... yes, chasers which slowly, ever so gradually into a low sink of nastiness destroy the character's I.Q. (life).

The object of the game is to collect geometric formulae for Storm to remember. Oh, yes, that wasn't mentioned was it? - Storm, that's the character's handle. Yeah, you've got a game set inside a geometric Gehenna with a character that goes by the name of someone that sounds like a young reckless widow on the set of Bonanza.

The formulae are broken down into simple components which must be collected in the correct order. If they are collected in the wrong order the level is restarted. Before a level begins the required formula is displayed for a short time. And that is important. Always check that formula and make sure you get it into your brain before attempting the collection process. You end up bouncing all over the rings and not getting anywhere very quickly.

Professor Storm's movements around the circle's rim are controlled by three keys. Two of the keys allow him to move clockwise or anti-clockwise and a third takes him from one rim to another where the circles touch. His speed varies depending on whether he is travelling faster or, against it, slower. If no movement key is pressed Storm moves around the rim at speed on the spokes' rotation. His stray

thoughts move in a similar manner.

Stray thoughts? Hmm, didn't tell you about such wanderings of the mind, did I? Well there are several types.

The first type move in a random pattern switching from circle to circle. The second type (set in their ways) always follow the same pattern of movement. The third and the deadliest form attempt to home in on Storm.

When a stray thought touches Storm it is temporarily paralyzed. It has no speed of its own and cannot transfer to another circle, yet it does still move with the rotation of the spoke.

But look, we didn't come here to mess around with the spin cycles of a mathematical wheel. We're here to collect objects and that is what we are going to do. So, when Storm makes a continuous revolution of a circle and it contains a bubble, the bubbles burst. The object vanishes along with the bubble and takes immediate effect, eg. appearing on the control panel if it is part of the formula. Contained in the centre of the spokes are the following objects:

1. A letter, symbol or number which is part of the formula for that level.
2. Nothing.
3. A calculator which increases the speed of Storm's movement.
4. A book which increases I.Q.
5. A hammer which allows him to chase away and stun stray thoughts.
6. A trashcan. This places the last letter of the collected sections of the formula in the center of the bubble. It may then be picked up at the wrong time.

Then, there are the bubbles which will burst the instant that Storm enters the circle.

1. Fond memories (e.g. ice cream cone) paralyze Storm so that he may not move and is carried around the circle for a certain length of time. These activate the instant that he joins the circle.

2. Abstract memories (e.g. a molecule) which reduce I.Q. by a small amount.

Intelligence Quotient

Storm's status in the game is reflected in his I.Q. The I.Q. is initially high, but if stray thoughts touch him, thereby distracting him he becomes more confused and his I.Q. drops. Some objects may help him regain his I.Q. as will the completion of a level. If his I.Q. ever drops to zero, then Storm has become a moron and the game is, as they say in Jamaica - over.

Rock and roll, or what? Pretty cosmic, I'd say. A very interesting game based on the method of mazes and reaching hidden treasures to activate additional scores and raising you to higher levels. It's funky, it's wise. Not a game into high digits of geometrically perverse barriers as it lends itself to making you believe, but more an abstract tap into the mind. The circuitry of the mind, playing, literally with thoughts, their processes and development of ideas. It's what goes on inside the grey matter, the pink and the red.

Graphics level out at basic. They've added the colour, the tinting, the semi-gloss for the smooth gazable moments you have to spend at the screen. Music is reputable. It's come across both my ears now as good and in harmony with the adventures of traversing the smoky corridors of a human brain.

So y'all, remember this fact. They have not as yet worked out the final equation for *Pi R squared*. If the game takes us at least half the way to something definite in entertainment, which it does, then we cannot complain, and perhaps will never care what that final result could have been. □

C-128 function keys for the Commodore 64

by Graham Winterflood

IF YOU spend a lot of time writing your own programs then you will know that some sort of wedge is almost mandatory in order to save time and make your task easier. This handy little program sets up the function keys on your C-64 to most of the functions that are built into the C-128 and is useful to owners of either machine.

I have developed this wedge over a period of time with two main themes in mind. First it had to be easy to use, and second it had to be short. Now on first glance at the accompanying data statements you may be tempted to point the finger of accusation and proclaim AHA!! he has failed the second requirement already. Do not despair! When we have finished with this session you will have a program on disk occupying only three blocks which will provide you with a very useful utility. In fact this program is the fi-

rst thing I load the moment I turn on my trusty old 64.

Well, so much for the hard sell, but what is a wedge, I hear you ask. It is simply a machine code program hidden away somewhere in memory which enables the user to achieve with one keypress what would normally take several commands. It does this by diverting the normal operating system to have a look at your program each time a key is pressed. An example is the sequence required to view the disk directory, which is

LOAD"\$",8

a total of ten keystrokes. With this wedge you press the F3 function key and hey presto! up comes the directory. A further feature is that the directory does not destroy your program in memory which will happen if you use the normal method. This is exactly as it works on a

Commodore 128 so that if you use both machines there will not be any confusion when switching from one to another. Right. Let's go ahead with the built in functions.

F2 - DLOAD"

After pressing F2 (shift/F1) type in the filename and hit return. Do not follow the filename with closing quotes or commas. The wedge will load the desired program beginning at the location from which it was saved. If the filename does not exist on the disk an error message will be displayed. Programs normally loaded with "filename",8,1 will be loaded to the correct location using the F2 function key. If you hit F2 then decide not to load a program, just hit return.

F3 - Directory

This will display the directory of the

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disk in the drive. If there is no disk or the disk is not formatted, the wedge will display an error message and turn off that annoying blinking light. Neat huh? If the directory is longer than the screen length, the wedge will display the message PRESS RETURN after each twenty three file names so that the directory does not scroll out of view.

F5 - DSAVE"

As with loading programs, just type in the file name and hit return. Do not use following quotes or commas. Note that this function is only for saving Basic programs. Machine code programs require more parameters to be set up than can be done with one function key. If you have accidentally hit the F5 key, and do not wish to save anything just hit return.

F6 - RUN

To run a Basic program already in memory hit F6 (shift/F5)

F7 - LIST

Pressing F7 will list the Basic program in memory.

You will note that there are three function keys left out. On the C-128 they are F1 - GRAPHIC: This one is not applicable to the C-64; F4 - SCNCLR, the same as Shift/clear home anyway; F8 - MONITOR, a machine code monitor built into the C-128 and not applicable to the C-64. Apart from those all the rest are the same.

Now for a couple of extra features. Pressing the shift key while a program is listing will pause the program until the key is released. This is known as shift/pause and is similar to the NO SCROLL key on the C-128. I have also added an easy method to change the colour of the screen or border. The left arrow key followed by a number (return) will change the border colour, and the up arrow key followed by a number (return) will change the screen colour. This saves typing in a lot of pokes to change colours. If no number is entered the colour defaults to black. An easy way to remember which key does what is that the left arrow key points to the border and the up arrow key points at the screen.

Getting back to the first theme of ease of use. Most wedges will be disabled when the run/stop restore combina-

tion is hit, and this is no exception, but to re-enable them you usually have to remember a SYS number to reset the interrupt vectors. With this wedge a reset of the vectors is accomplished by pressing the left arrow key then RETURN and the function keys are back in action.

No trying to remember a SYS address. Note that this is the same key which changes the border colour. If your function keys are not working, hit the left arrow key (return) and try again. Sometimes you may have done a cold start, either by typing SYS 64738 or hitting the reset button if one is installed. In this case the left arrow key will not work, however typing SYS 52000 will normally reactivate the wedge anyway, as the machine code is still in memory until the computer is switched off, or possibly some other machine code has been installed over the top.

O.K. Now it is time for you do some work. Type in and save the program.

N.B! Ensure you save a working copy of this program before continuing, as a little later we will be typing NEW. Now type RUN. There will be a few seconds delay while the data is poked into memory, and provided you have made no typing errors the screen will go black, the border will change to grey and the cursor to orange. If you have made an error in the data statements the program will alert you and a correction may be made. Assuming all is well the wedge will now be activated but you will notice that the program occupies about twelve blocks on disk. You can check this by hitting the F3 function key to view the directory. So, what about the far fetched claim to squash all of this into three blocks? Read on.

Follow these directions very carefully. First make sure that the program you have typed in has been loaded and runs correctly. Now type NEW and type in the following two lines of program exactly as shown here:

```
10SYS2072
20NEW
```

hitting Return at the end of each line. Now in direct mode type in:-

```
SYS 51883
```

and hit Return. Nothing will appear to happen but before doing anything else

type SAVE"WEDGE",8 and save this program on disk. If you already have a file named WEDGE on the disk, just choose another file name for this utility (like : NOT THE KINGSWOOD). Now check the disk directory. There should be a three block program named WEDGE on the disk. This is what we have been after and the Wedge can now be loaded with a simple LOAD"WEDGE",8 command and Run like a normal program.

So there it is, a three block program that sets your C-64 up to act like a C-128. I have saved the program as the first file on most of my disks so that whenever I am working in C-64 mode it saves hunting around for the particular disk with the wedge on it. After checking that everything works as described, the original program containing the data statements is no longer required and may be discarded.

Well, how did it work? When you entered SYS 51883 the machine code was transferred from where it was stored in high memory and tacked onto the end of our short Basic program we just entered. Next a couple of zero page locations were altered to make the computer think that the end of the program was at the end of the machine code and then we saved it. This is how it was all squeezed into three blocks of code, and demonstrates the efficiency of machine code over Basic. When you subsequently load the program and type RUN, the machine code is transferred back up to where it came from, the wedge is activated, and the Basic program NEWs itself as it is no longer required.

If you wish to have different colours as the default colours in your copy of the program, carry out the following steps. First load the short wedge we have just created but do not run it, then type in the three following pokes in direct mode and resave the program under another name.

```
For screen colour...POKE 2147,n
For border colour...POKE 2152,n
For cursor colour...POKE 2157,n
```

where n is the number of the colour you wish from your users guide.

Well that's about it. It has been a long hard road and I trust you will find this utility a useful vehicle. Hang on, this isn't a motor magazine. □

Programming



```
1 rem-----
2 rem
3 rem  c-128 function keys for the c-64
4 rem
5 rem      by g.winterflood
6 rem
7 rem-----
100 for x = 51883 to 52537
110 read b:poke x,b
120 ch=ch+b
130 next
140 if ch<>87843 then 580
150 sys 52000
160 print
170 print"wedge activated"
180 end
190 data 169,214,133,251,169,202,133,252,169,24,133,253,169,8,133,254,162
200 data 3,160,0,177,251,145,253,200,208,249,230,252,230,254,202,208,240
210 data 169,128,133,45,169,10,133,46,96,169,64,133,251,169,8,133,252
220 data 169,254,133,253,169,202,133,254,162,3,160,0,177,251,145,253,200
230 data 208,249,230,252,230,254,202,208,240,76,32,203,0,0,0
240 data 76,73,83,84,13,82,85,78,13,68,76,79,65,68,34,68,83
250 data 65,86,69,34,80,82,69,83,83,32,18,82,69,84,85,82,78
260 data 169,0,141,33,208,169,12,141,32,208,169,8,141,134,2,120,169
270 data 135,141,20,3,169,203,141,21,3,169,115,141,6,3,169,203,141
280 data 7,3,169,80,141,0,3,169,203,141,1,3,88,96,173,0,2
290 data 201,174,240,7,201,95,240,12,76,139,227,173,1,2,141,33,208
300 data 76,116,164,173,1,2,141,32,208,32,47,203,76,116,164,72,138
310 data 72,152,72,173,141,2,201,1,240,249,104,168,104,170,104,76,26
320 data 167,165,197,197,159,208,3,76,49,234,133,159,201,5,208,6,32
330 data 45,204,76,123,227,201,3,208,3,76,214,203,201,4,208,10,174,141,2
340 data 224,1,208,3,76,237,203,201,6,208,216,174,141,2,224,1,240
350 data 3,76,13,204,162,5,160,0,189,254,202,153,119,2,232,200,192
360 data 4,208,244,169,4,133,198,76,49,234,162,0,160,0,189,254,202
370 data 153,119,2,232,200,192,5,208,244,169,5,133,198,76,49,234,162
380 data 9,160,6,189,254,202,32,210,255,232,136,208,246,32,19,205,169
390 data 0,32,213,255,134,45,132,46,32,222,204,76,123,227,162,15,160
400 data 6,189,254,202,32,210,255,232,136,208,246,32,19,205,169,43,166
410 data 45,164,46,32,216,255,32,222,204,76,123,227,169,147,32,210,255
420 data 169,1,133,204,169,0,133,176,169,13,162,8,160,0,32,186,255
430 data 169,1,162,96,160,163,32,189,255,32,192,255,32,222,204,162,13
440 data 32,198,255,32,207,255,32,207,255,32,207,255,32,207,255,201,0
450 data 240,110,32,207,255,170,32,207,255,32,205,189,169,32,32,210,255
460 data 32,207,255,201,0,208,82,169,13,32,210,255,32,225,255,240,78
470 data 230,176,165,176,201,23,144,206,32,204,255,162,0,189,19,203,32
480 data 210,255,232,224,13,208,245,169,13,32,210,255,32,228,255,201,0
490 data 240,249,169,145,32,210,255,162,232,169,32,32,210,255,232,208,248
500 data 169,13,32,210,255,169,145,32,210,255,162,13,32,198,255,169,0
510 data 133,176,240,142,32,210,255,24,144,161,169,13,32,195,255,32,204
520 data 255,96,169,0,133,144,169,8,32,180,255,169,111,32,150,255,32
530 data 165,255,201,48,208,4,32,171,255,96,72,169,13,32,210,255,104,32
540 data 210,255,32,165,255,164,144,240,246,32,171,255,169,13,32,195,255
550 data 76,123,227,160,0,32,207,255,201,13,240,6,153,0,2,200,208
560 data 243,192,0,240,17,152,162,0,160,2,32,189,255,169,3,162,8
570 data 168,32,186,255,96,76,123,227
580 print"error in data statements"
```

ready.

Little Invoicer

by Andrew Farrell

Do you run a small business? Wish you could produce simple invoices and keep track of your accounts? Here's a program that will put you on the way.

LITTLE INVOICER will allow you to enter clients, inventory, print out mailing lists, and invoices from a simple menu driven environment. The program SAVES your information to a sequential file. This is an extra useful feature, since you may LOAD and EDIT your files using a word processor such as Easy Script.

Operation

Most of the program is straight forward to use. However, there are a few tricky areas to watch for. From the main menu there are seven options, six of which are active.

Enter/Edit client allows you to modify or enter an account. A menu will appear with the option for NEW or EDIT. Select NEW, and enter the appropriate details. F1 and F2 can be used to move up and down between fields respectively.

To modify a client, select EDIT. Now enter the client name, or part of, or press / to view the current list. MOVE the cursor keys to highlight and press return to select. The edit screen will then be displayed.

Before you can proceed with option two, you will need to enter some inventory items. Do this with option five. The same method of entry applies as for clients, as well as the ability to select from all items using the / function.

The fields hold information as follows:-

Description : The inventory item name. Eg: Nails 10 cm. Retail : The retail value of the item. Eg: \$1.26

(Do not enter the \$ sign)

Cost : The cost to you of the item. Eg: \$.45

Bulk, Dealer and Direct are three levels of discount for sale of the item. These

three may be chosen between using the transaction function. For example nails might be \$.60 in bulk to large buyers. \$.95 to dealers or retailers, and for direct sales, a small discount from the retail price might apply - perhaps \$1.15.

Be sure to enter a positive value in each field.

You can now make an invoice using option two. Enter the client name, or use the / function. The client details will be displayed. Enter the date of the transaction, using any format appropriate.

Now enter the product code. This corresponds to the record number displayed during inventory entry. The description will automatically appear. Then enter the quantity. A zero quantity will cause the product code to be re-entered. A zero product code will finish the transaction.

When a title appears under rate, press space bar to cycle between the various prices. Hit return to accept your choice. The Amount will be automatically calculated. When complete you may print the invoice. Enter the invoice number, margin and a comment if required. Insert a single sheet of paper in your printer. The invoice will then be printed.

Option four and five LOAD or SAVE your file. Do this after you add a new group of inventory items or clients. Each transaction is not recorded. Option seven prints mailing labels. This is useful if you're doing a batch of invoices in one hit. Many of the program features can be modified, so feel free to get in there and have a bash.

A compiled version of this software, which is radically faster, appears on Issue Nine of the Disk Magazine. □

```

0 rem ----- little invoicer -----
1 goto 1000
2 print "[C@] [LEFT]";c=0:poke198,0:
3 geta$:ifa$(">")then7
4 c=c+1:ifc=15thenprint " [LEFT]";:
5 ifc=30thenc=0:print "[C@] [LEFT]";:
6 goto3
7 a%=asc(a$):if(a%>64anda%<91)or(a%>44anda%<58)ora%>32or(a%>192anda%<219)thenreturn
8 ifa%=20ora%=13andxx(">")thenprint " ";return
9 ifa%=133ora%=134thenf2=1:return
10 goto2
11 f2=0:b%=0:gotosub2
12 ifa%=20andlen(in$)>0thenin$=left$(in$,len(in$)-1):print "[LEFT] [LEFT] [LEFT]";:goto11
13 ifa%=13or f2=1thenprint " ";return
14 ifa%=20thenprint "[LEFT]";:goto11
15 iflen(in$)<11thenin$=in$a$:printa$;:goto11
16 print " [LEFT]";:goto11
40 am=am*100:am=str$(am)
41 print:print "[UP]"left$(v$,40-len(am$)) "[UP]"mid$(am$,2,len(am$)-3) ". "right$(am$,2);
42 tm$=left$(sp$,12-len(am$))+mid$(am$,2,len(am$)-3) "+ "right$(am$,2)
43 return
50 rem -----
52 rem locate or display client/s
53 rem -----
54 print "[DOWN](<E>nter Client to Locate or </> - Select"
55 print "[DOWN] [DOWN] -----";:mi=25:in$="":gosub11:ifin$="/ "then gosub2000:return
60 i=1:ss=in$:d=len(ss$)
65 z$=left$(c$(i,1),d):ifz$=ss$thencr=i:
return
75 i=i+1:if i<101then65
80 cr=i:return
100 rem -----
102 rem main menu
104 rem -----
106 m$="Main Menu":gosub900
110 print
114 print" 1 - Enter/Edit Client
116 print" 2 - Transaction/Invoice
118 print" 3 - Save File
120 print" 4 - Load File
122 print" 5 - Enter/Edit Inventory
"
124 print" 7 - Mailing Labels
126 print

```


Programming

```

128 print" 99 - Quit
130 gosub1100
140 ifm=0then106
150 on m goto 200,300,400,500,600,100,80
0,100,100,100,100,100,100
199 stop
200 rem -----
201 rem enter/edit client
202 rem -----
206 m$="Enter/Edit Client":gosub900
210 print" 1 - New Client
220 print" 2 - Edit,Client
230 print
232 print
234 print" 9 - Main Menu
240 gosub1100:ifm=0then206
242 onmgoto250,250,280,270,200,200,200,2
00,100
250 ifm=1thenin$="" :gosub60:goto270
252 gosub900:gosub50
270 gosub900:f1=0:print" Record : "cr
272 gosub290:fe=1
274 z$=c$(cr,fe):ifz$="**"thenz$=""
275 print"[HOME][DOWN][DOWN][DOWN][DOWN]
[DOWN]"left$(dd$,fe)f$(fe)" : "z$;:in$=z
$:ml=f(fe)
276 gosub11:iffe=1andf1=1andin$=""thenin
$="**"
277 c$(cr,fe)=in$:
278 fe=fe-(a%=134)-((fe>1)*(a%=133))-(a%
=13)
280 iffe<7then274
282 :
284 print:print"[DOWN][DOWN]<RETURN> - N
ext <M>ain Menu <P>rior"
285 print"[DOWN] Option --->";:ml=2:in$=
"":gosub11:
286 ifin$="m"then100
287 ifin$=""thencr=cr+1:goto270
288 ifin$="p"andcr>1thencr=cr-1:goto270
289 goto200
290 f1=0:print"[DOWN][DOWN]";:ifc$(cr,1)
="**"thenc$(cr,1)="" :f1=1
292 fori=1to6:printf$(i)" : "left$(c$(cr
,i)+sp$,27);
294 next:return
299 stop
300 rem -----
310 rem transaction/invoice
320 rem -----
325 m$="Transaction/Invoice"
340 gosub900:gosub50
350 gosub900:print"[UP][UP][UP][UP][UP]"
::gosub290
352 print" Date : ";:ml=12:in$="" :g
osub11:dt$=in$
360 print"Code:Description :Qty:R
ate:Amount";

```

```

365 print "[CT][CT][CT][CT][CT][CT][CT][CT]";ln=1
370 print "[HOME]"left$(dd$,ln+10);:ml=3:in$="":gosubll:pc=val(in$):ifpc=0andln=1then100
371 iv(ln,1)=pc:ifpc=0thenl600
372 ifi$(pc,1)=""then370
374 print:print"[UP][UP]"left$(v$,5)lef$(i$(pc,1)+sp$,19)
375 print"[UP]"left$(v$,25);:ml=3:in$="":gosubll
378 zz=val(in$):ifzz=0then370
379 iv(ln,2)=zz:rt=1
380 print"[UP]"left$(v$,29)rd$(rt):poke198,0:wait198,1:getr$:ifr$=chr$(13)then384
382 rt=rt+1:ifrt=4thenrt=1
383 goto380
384 rt=val(i$(pc,3+rt)):am=rt*iv(ln,2)*100:am$=str$(am):iv(ln,3)=rt
388 printleft$(v$,40-len(am$)) "[UP]"mid$(am$,2,len(am$)-3)". "right$(am$,2);
389 tt$(ln)=left$(sp$,7-len(am$))+mid$(am$,2,len(am$)-3)+". "+right$(am$,2)
390 ln=ln+1:ifln<11then370
399 gotol600
400 rem -----
410 rem save file
420 rem -----
430 print"[DOWN] Saving -->[RVON][LRED] ";
440 open2,8,2,"temp,s,w":print"[RVON] ";
450 i=1:c2=0
455 ifc$(i,1)=""then470
460 forj=1to6:z$=c$(i,j):ifz$=""thenz$="$"
461 print#2,z$:nextj
462 i=i+1:printmid$(ba$,c2*2+1,2)"[LEFT] ";c2=c2+1:ifc2=6thenc2=0:print"[RIGHT] ";
463 goto455
470 print#2,"***":print#2,ar$(1):print#2,ar$(2):close2:print"[RVON][LEFT] ";
475 close15:open15,8,15,"s0:names.dtf:p rint#15,"r0:names.dtf=temp"
480 print"[RVON] ";close15
499 gosubl400:gotos100
500 rem -----
510 rem load file
520 rem -----
530 print"[DOWN] Loading .";
540 open2,8,2,"names.dtf,s,r":print ". ";
550 i=1
552 input#2,z$:ifz$="***"thenc$(i,1)="",goto570
554 c$(i,1)=z$:forj=2to6:input#2,z$
555 ifz$="$"thenz$=""

```

```

-MAIN-  - Enter/Edit Client
        - Transaction/Invoice
        - Save File
        - Load File
        - Enter/Edit Inventory
        - Mailing Labels
99 - Quit

```

Option -->_

```

560 c$(i,j)=z$
562 nextj:i=i+1:goto552
570 close2:print" ."
599 gosub1500:goto 100
600 rem -----
601 rem enter/edit inventory
602 rem -----
606 m$="Enter/Edit Inventory":gosub900
610 print" 1 - New Product
620 print" 2 - Edit Product
622 print" 3 - Delete Client
630 print
632 print
634 print" 9 - Main Menu
640 gosub1100:ifm=0then206
642 onmgoto650,650,680,670,600,600,600,6
00,100
650 ifm=1thenin$="":gosub1260:goto670
652 gosub900:gosub1250
670 gosub900:f1=0:print" Record : "cr
672 gosub690:fe=1
674 z$=1$(cr,fe):ifz$="**"thenz$=""
675 print"[HOME][DOWN][DOWN][DOWN][DOWN]
[DOWN]"left$(dd$,fe)f1$(fe)" : "z$;:in$=
z$:ml=f1(fe)
676 gosub11:iffe=1andf1=1andin$=""thenin
$="**"
677 i$(cr,fe)=in$:
678 fe=fe-(a%=134)-((fe>1)*(a%=133))-(a%
=13)
680 iffe<7then674
682 :
684 print:print"[DOWN][DOWN]<RETURN> - N
ext <M>ain Menu <P>rior"
685 print"[DOWN] Option --->";:ml=2:in$=
"":gosub11:
686 ifin$="m"then100
687 ifin$=""thenincr=cr+1:goto670
688 ifin$="p"andcr>1thenincr=cr-1:goto670
689 goto600
690 f1=0:print"[DOWN][DOWN]";:if1$(cr,1)
="**"theni$(cr,1)="":f1=1
692 fori=1to6:printf1$(i)" : "i$(cr,i)
694 next:return
699 stop

```


Programming

```

800 rem -----
810 rem print mailing labels
820 rem -----
830 m$="Print Mailing Lables":gosub900
840 print"[DOWN][DOWN] Ready Printer Now
"
845 print"[DOWN][DOWN] Range From :";in
$="":m1=3:gosub11:f=val(in$)
848 print"[DOWN][DOWN] Range To :";in
$="":m1=3:gosub11:t=val(in$)
849 print"[DOWN][DOWN] Label Gap :";in
$="7":m1=2:gosub11:lb=val(in$)
850 i=f:
860 open4,4
870 cmd4
880 printtab(10)c$(i,1):printtab(10)c$(i
,2):printtab(10)c$(i,3),c$(i,4)
882 forz=1to1b:printnext
890 i=i+1:ifi>tthen898
892 goto880
898 print#4:close4:goto100
900 print"[CLR]"tab(int((40-len(m$))/2))
"[LGRN][RVON] "m$ " [RVDF][LBLU]"
910 print:print:return
1000 rem -----
1010 rem little invoicer
1020 rem -----
1022 rem gosub3000 sys51744
1025 poke53280,0:poke53281,0:print"[LBU
]"chr$(9)chr$(14)chr$(8)
1030 dim c$(100,6),ac(100),i$(50,6),ai(5
0),iv(10,3)
1040 cr=1:c$(1,1)="*"
1050 fori=1to6:readf$(i),f(i):next
1055 fori=1to6:readf1$(i),f1(i):next
1070 ln$="-----"

1072 sp$="
":sp$=sp$+sp$
1074 ba$="[RVDF][CH][RVDF][CJ][RVDF][CK]
[RVON][CL][RVON][CN][RVON] "
1080 dd$="[DOWN][DOWN][DOWN][DOWN][DOWN]
[DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][DO
W][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][D
OWN][DOWN][DOWN][DOWN][DOWN]"
1081 v$="[RGHT][RGHT][RGHT][RGHT][RGHT][
RGHT][RGHT][RGHT][RGHT][RGHT][RGHT][RGHT
][RGHT][RGHT][RGHT][RGHT][RGHT][RGHT][RG
HT][RGHT][RGHT][RGHT][RGHT][RGHT][RGHT][
RGHT][RGHT][RGHT][RGHT][RGHT][RGHT][RGHT
][RGHT][RGHT][RGHT][RGHT][RGHT][RGHT][RG
HT][RGHT]"
1082 close15:open15,8,15,"s0:temp"
1090 rd$(1)="Bulk"
1091 rd$(2)="Deal"
1092 rd$(3)="Drct"
1099 goto 100
1100 in$="":m1=2:print"[DOWN][DOWN]
ption -->";gosub11:m=val(in$):return

1250 rem -----
1252 rem locate or display inventory
1253 rem -----
1254 print"[DOWN]<E>nter Item to Locate
or </> - Select"
1255 print"[DOWN][DOWN] ---->";m1=25:
in$="":gosub11:ifin$="/"thengosub2300:re
turn
1260 i=1:ss$=in$:d=len(ss$)
1265 z$=left$(i$(i,1),d):ifz$=ss$thencr=
i:return
1275 i=i+1:ifi<101then1265
1280 stop
1400 rem -----
1410 rem save file (inventory)
1420 rem -----
1430 rem
1440 open2,8,2,"temp,s,w":print"[RVON] "
;
1450 i=1
1455 ifi$(i,1)=" "then1470
1460 forj=1to6:z$=i$(i,j):ifz$=""thenz$=
" "
1461 print#2,z$:nextj
1462 i=i+1:printmid$(ba$,c2*2+1,2)"[LEFT
]";c2=c2+1:ifc2=6thenc2=0:print"[RGHT]"
;
1463 goto1455
1470 print#2,"***:print#2,is$:close2:pr
int"[LEFT][RVON] ";
1475 close15:open15,8,15,"s0:invent.dtf"
:print#15,"r0:invent.dtf=temp"
1480 close15
1499 return
1500 rem -----
1510 rem load file (inventory)
1520 rem -----
1530 print"[DOWN] Loading .";
1540 open2,8,2,"invent.dtf,s,r":print "
";
1550 i=1
1552 input#2,z$:ifz$="***"theni$(i,1)="
":goto1570
1554 i$(i,1)=z$:forj=2to6:input#2,z$
1555 ifz$="*"thenz$=""
1560 i$(i,j)=z$
1562 nextj:i=i+1:goto1552
1570 close2:print "
"
1599 return
1600 rem -----
1610 rem select invoice and print
1620 rem -----
1625 print"[CT][CT][CT][CT][CT][CT][CT][
CT][CT][CT][CT][CT][CT][CT][CT][CT][CT][
CT][CT][CT][CT][CT][CT][CT][CT][CT][CT][
CT][CT][CT][CT][CT][CT][CT][CT][CT][CT][
CT][CT][CT]Total":am=0
1630 fori=1to1n-1:am=am+(iv(i,3)*iv(i,2
)):nexti:gosub40
1640 print"[DOWN]<P>rint Invoice <M>ain
Menu <A>uxiliary":poke198,0:wait198,1:ge
tr$
1642 ifr$="m"then100
1644 ifr$="p"then1650
1646 goto300
1650 rem **** print it ****
1660 m$="Print Invoice":gosub900
1661 print"[DOWN][DOWN] Invoice # : aw"
;:in$="":m1=3:gosub11:a1=val(in$)
1662 print"[DOWN][DOWN] Right Margin :
";:in$="8":printin$;m1=3:gosub11:rm=val
(in$)
1663 print"[DOWN][DOWN] Memo Line :
";:in$=mem$:printin$;m1=30:gosub11:mem$
=in$
1664 print"[DOWN]Position Paper Now then
press any key.":poke198,0:wait198,1
1665 open4,4:cmd4:print:print
1666 printtab(rm)c$(cr,1):printtab(rm)c$
(cr,2):printtab(rm)c$(cr,3),c$(cr,4):pri
nt:print
1668 printtab(rm)"Attention : "c$(cr,5):
print:print
1670 printtab(25)chr$(14)"I N V O I C E"
chr$(20)
1671 print:printtab(14)"Date : "dt$tab(1
6)" Invoice #: aw"a1
1672 print:print:printtab(rm)ln$
1674 printtab(rm)":Code : Description
:Qty : Unit Price : Amou
nt"
1675 printtab(rm)ln$
1676 fori=1to1n-1:p$=str$(iv(i,1)):p$=le
ft$(sp$,4-len(p$))+p$:ld$=":"p$+" : "
1678 p$=i$(iv(i,1),1):p$=":"p$+left$(sp
$,27-len(p$)):ld$=ld$+p$+" : "
1680 p$=str$(iv(i,2)):p$=left$(sp$,3-len
(p$))+p$:ld$=ld$+p$+" : "
1682 p=iv(i,3)*100:am$=str$(p):p$=left$(
sp$,11-len(am$))
1683 p$=p$+mid$(am$,2,len(am$)-3)+". "+ri
ght$(am$,2)
1684 ld$=ld$+p$+" : "+tt$(i)
1685 printtab(rm)ld$:nexti:forz=1to10-i:
print:next
1690 printtab(rm)ln$:print:printtab(rm)"
Total"left$(sp$,59-len(tm$))tm$
1692 print:printtab(rm)ln$:
1696 printtab(rm)mem$
1698 print#4:close4
1699 goto300
2000 rem -----
2010 rem display clients
2020 rem -----
2025 i=1:t=0:l=1:cr=1:cc=0:s=0
2030 m$="Display Clients":gosub900
2040 pg=0:l1=1:s=0:c1=0
2050 z$=left$(c$(i,1),19)

```


Programming

```

2060 ifz$="$$$"orz$=""thenpg=1:goto2100
2070 printtab(s)z$:i=i+1:l1=1+l1:c1=c1+1
:ifc1=38thenpg=1
2080 ifl1=20thenl1=1:s=20:print"[HOME][D
OWN][DOWN]"
2090 ifpg=0then2050
2100 rem
2110 print"[HOME][DOWN][DOWN]"tab(t)"[RV
ON]"left$(dd$,1)left$(c$(cr,1),19);:ol=1
:oc=cr:ot=t
2120 poke198,0:wait198,1:getr$
2130 ifr$="[DOWN]"andcr<100thenl1=1+l1:cr=
cr+1:ifl1=20thenl1=1:t=20:cc=cc+1
2131 ifr$="[RGHT]"andcc=0thencc=1:cr=cr+
19:t=20
2132 ifr$="[UP]"andcr>1thenl1=1-l1:cr=cr-1
:ifl1=0thenl1=20:t=0:cc=cc-1:
2133 ifr$="[LEFT]"andcc=1thencc=0:cr=cr-
19:t=0
2134 ifr$=chr$(13)thenreturn
2140 ifcc=-1thencc=1:t=20:l1=19:i=cr-37:g
oto2030
2145 ifcc=2thencc=0:t=0:l1=1:goto2030

```

```

2170 print"[HOME][DOWN][DOWN]"tab(ot)"[R
VOF]"left$(dd$,ol)left$(c$(oc,1),19);:go
to2110
2300 rem -----
2310 rem display inventory
2320 rem -----
2325 i=1:t=0:l1=1:cr=1:cc=0:s=0
2330 m$="Display Inventory":gosub900
2340 pg=0:l1=1:s=0:c1=0
2350 z$=left$(i$(i,1),19)
2360 ifz$="$$$"orz$=""thenpg=1:goto2400
2370 printtab(s)z$:i=i+1:l1=1+l1:c1=c1+1
:ifc1=38thenpg=1
2380 ifl1=20thenl1=1:s=20:print"[HOME][D
OWN][DOWN]"
2390 ifpg=0then2350
2400 rem
2410 print"[HOME][DOWN][DOWN]"tab(t)"[RV
ON]"left$(dd$,1)left$(i$(cr,1),19);:ol=1
:oc=cr:ot=t
2420 poke198,0:wait198,1:getr$
2430 ifr$="[DOWN]"andcr<100thenl1=1+l1:cr=
cr+1:ifl1=20thenl1=1:t=20:cc=cc+1

```

```

2431 ifr$="[RGHT]"andcc=0thencc=1:cr=cr+
19:t=20
2432 ifr$="[UP]"andcr>1thenl1=1-l1:cr=cr-1
:ifl1=0thenl1=20:t=0:cc=cc-1:
2433 ifr$="[LEFT]"andcc=1thencc=0:cr=cr-
19:t=0
2434 ifr$=chr$(13)thenreturn
2440 ifcc=-1thencc=1:t=20:l1=19:i=cr-37:g
oto2330
2445 ifcc=2thencc=0:t=0:l1=1:goto2330
2470 print"[HOME][DOWN][DOWN]"tab(ot)"[R
VOF]"left$(dd$,ol)left$(i$(oc,1),19);:go
to2410
9000 data "      Name",25,"      Address1",2
5,"      Address2",25,"      Post Code",5
9010 data "      Contact",20,"      Phone",1
6
9020 data "Description",25,"      Retail"
,6,"      Cost",6
9030 data "      Bulk",6,"      Dealer",
6,"      Direct",6

```

NEW — Australian Commodore Review Disk Magazine No 8!

Utilities

Track and Sector — modify disks, find secret words, and modify programs directly using this brilliant utility. Every true hacker needs one.

Function Keys — how would you like 128 function keys on your Commodore 64. This program does it all.

Unscratched — did you actually erase a file lately? If so you need this nifty utility to bring it back.

Relocatable directory — if you need to see what's on a disk without losing your basic program use this little beauty. Specially written to sit anywhere in memory.

Tape Rename — if you need to rename a tape program without the hassle of loading and saving it, this is the answer. See article in this issue.

Games

A super special for issue 8. A complete machine language arcade type game. Excellent graphics and sound.

Future Writer — Send musical letters to your friends using the program the experts use.

This is the one that programmers use to pass on special messages to each other.

Includes various character sets and a selection of music.

Home/Business

Calendars — need to find out a special date in the past and the future? This program will calculate the exact date and day.

Chequewriter — for a professional finish to your cheques why not print them out.

Screen clock — if you need to keep track of the time whilst you're programming this program displays the date and time at the top of the screen. Remains running even as you type.

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Programming in Machine Code

Part III

by Andrew Baines

IN THE August and October issues, we've covered a lot of new ground. So this issue we'll look at how the instructions presented so far are implemented. The first program moves the cursor in response to a joystick in port two. It will respond to eight different directions, and is interrupt driven. Let's take a look!

130 ; this routine reads joystick
150 ; port two and moves the cursor
170 ; accordingly
190 * = \$5000 ; This tells the assembler to assemble the following code at \$50 00.

200 init SEI ; This instruction disables interrupts: it makes sure the machine doesn't try to generate an interrupt while we are changing the pointer to our interrupt software.

210 LDA \$314 ; Load the Accumulator with the location which holds the low byte of the interrupt pointer.

220 STA next ; Store the Accumulator in the location with the label next. We are saving the old interrupt routine's address in case another interrupt routine exists that is not the normal one at \$EA31. This allows more than one interrupt program to operate at once.

230 LDA \$315 ; Load the Accumulator with the high byte of the pointer to the current interrupt sequence.

240 STA next+1 ; Store the Accumulator in the location next+1. This is not a new label, this indicates the location next plus one: the location after next.

250 LDA #<move ; Our routine starts at location move. Here we are Loading the Accumulator with the value (#) of the low byte (<) of the location move. So if move represented location \$1234, the value Loaded into the Accumulator would be \$34.

260 STA \$314 ; Store the Accumulator in the lowbyte location of the pointer to the interrupt sequence.

270 LDA #>move ; These lines set the high byte of the pointer to the interrupt

sequence to our routine.

280 STA \$315

290 CLI ; Reenable interrupts.

300 RTS ; ReTurn from Subroutine.
Go back to BASIC.

310 next .byt 0,0 ; Here is the pointer to the next interrupt routine. 'byt' means byte, so the two zeros will be put into memory with the rest of the routine until changed by init.

So now our routine is recognised by the operating system: it is functioning. But how does it work? What does it do?

When the operating system finds that someone on the outside has pressed some buttons, it records this in the keyboard buffer. Then the program that is running can get them out using a Kernal routine whenever it wants to. This is the basic principle behind our program. We look at the joystick and record its movements in the keyboard buffer. So if you push up on the joystick, a chr\$(145) (cursor up) will find itself in the keyboard buffer. Later, the computer will look at the keyboard buffer and move the cursor up one.

The keyboard buffer is located at \$277, and the X register is used to index the buffer if there is more than one direction: ie: the joystick is being pushed in a diagonal direction.

320 move LDA 56320 ; Load the Accumulator with the location that has the information on the joystick plugged into port two, in it.

330 LDX #0:STX 198 ; Make sure that the number of characters in the keyboard buffer (198) is zero.

340 CMP #126 ; Compare the accumulator with the value (#) 126, the value that represents up. This instruction is very versatile: it allows use of all indexing modes, and is to the accumulator what CPX is to the X register.

350 BNE cont1 ; If the above Compare was not true: ie, the accumulator did not equal 126, branch to cont1.

360 JSR up ; Jump to SubRoutine to

the routine that puts an 'up' in the character buffer.

370 JMP (next) ; JuMP to the address in the location next (indicated by the brackets). So if next and next+1 had \$EA31 in them, in lowbyte/highbyte format, the computer would JuMP to \$EA31.

380 cont1 CMP #125 ; Since the joystick was not being pushed up, we'll check for down.

390 BNE cont2 ; If not, cont2 will become the next port of call for the sixty-four.

400 JSR down ; Down was the direction the joystick was being pushed, so we will Jump to SubRoutine to the routine down, which puts a 'cursor down' in the keyboard buffer.

410 JMP (next) ; JuMP to the next interrupt routine.

420 cont2 CMP #123 ; The joystick wasn't being pushed up or down, so now we CoMPare the Accumulator (it holds the information from the joystick location) with the value that represents a movement to the left.

430 BNE cont3 ; No go? Branch to cont3

440 JSR left ; Put a cursor left in the keyboard buffer.

450 JMP (next) ; Goto the next interrupt routine.

460 cont3 CMP #119 ; Okay, it wasn't up, it wasn't down and it wasn't left - so we'll try for a right: CoMPare the Accumulator with the value (#) 119 - the value for right.

470 BNE cont4 ; If not, branch to cont4

480 JSR right ; If so, cursor right in the keyboard buffer,

490 JMP (next) ; and next interrupt routine. I think you've got the idea, so from here on in, I will only use short descriptions.

500 cont4 CMP #122 ; Up and Left?

510 BNE cont5 ; No - cont5

520 JSR up ; Yes - cursor up,


```

530 JSR left ; and cursor left
540 JMP (next) ; next routine.
550 cont5 CMP #121 ; Down and
Left?
560 BNE cont6 ; No - cont6
570 JSR down ; Yes - cursor down
580 JSR left ; Cursor left,
590 JMP (next) ; and finish.
600 cont6 CMP #117 ; Down and
Right?
610 BNE cont7 ; No - cont7
620 JSR down ; Yes - cursor down
630 JSR right ; Cursor right,
640 JMP (next) ; finish.
650 cont7 CMP #118 ; Up and Right?
660 BNE end ; No - end
670 JSR up ; Yes - cursor up,
680 JSR right ; Cursor right,
690 end JMP (next) ; routine end.

```

Now comes the interesting part: The part where the cursor positioning is done.

700 up LDA #145 ; Load the Accumulator with the value (#) 145. This value moves the cursor up.

710 STA \$277,x ; Store the Accumulator indexed with X in the location \$277, which is the keyboard buffer. We need to index because if the joystick is pushed in a diagonal direction, there needs to be two values placed in the buffer, and indexing is the easiest way.

720 JMP store ; Jump to the store routine.

730 left LDA #157 ; Value for left

740 STA \$277,x ; Store in next available spot in keyboard buffer.

750 JMP store ; Goto the store routine.

760 right LDA #29 ; Right.

770 STA \$277,X ; Store in buffer.

780 JMP store ; Finish.

790 down LDA #17 ; Down.

800 STA \$277,x ; Buffer.

810 store INC 198:INX ; This small routine increments location 198, the number of characters in the keyboard buffer, and increments the X register, moving the 'pointer' to the next position in the buffer.

820 RTS ; Return from Subroutine.

So after it has been established which direction the joystick is being pushed, the keyboard buffer is loaded with the appropriate directions. This is the reason we need to use the X register to index into the keyboard buffer: to make sure

that the next character to enter the buffer does not overwrite the previous one, but goes in the next available position in the buffer.

The next routine we will look at, is one which will move sprite zero around within the confines of the screen, in response to a joystick in port two. The routine can be an interrupt driven one, or called whenever desired. It will not set up sprite zero, so this must be done beforehand. You might have noticed that this routine differs in appearance to the above routine. This is because the above routine is 'source code,' code that has not been assembled into memory yet, and the next routine is a disassembly of memory. Therefore, it has no easy labels. The reason for this is that I did not write source code for this program, I simply assembled it straight into memory using a line assembler.

C000: LDA DC00 ; Load the Accumulator with the location concerned with joystick port two, ready for comparisons.

C003: CMP #\$7E ; Compare the accumulator with the value (#) \$7E. This is the value that represents up.

C005: BEQ C05C ; If the joystick is being pushed up, the Branch if Equal will be executed, the next instruction to be executed will be at \$C05C.

C007: CMP #\$7D ; Compare the accumulator with the value (#) \$7D, the value for down.

C009: BEQ C069 ; If the accumulator is Equal to \$7D, Branch to \$C069.

C00B: CMP #\$7B ; Compare the accumulator with the value for left, \$7B.

C00D: BEQ C017 ; If the accumulator and the value above are Equal, Branch to \$C017.

C00F: CMP #\$77 ; Last but not least, is the joystick being pushed right?

C011: BEQ C037 ; If yes is the answer, Branch to \$C037.

C013: RTS ; If not, Return from Subroutine

This is the first of the actual routines that move the sprite. This one moves the sprite left. There are two smaller routines within this routine, one for each slab of the screen: ie, One for when the sprite is between X- locations 0 and 255, the other for positions larger than 255.

C017: LDX D000 ; Load the X register with the 8 LSB's of the X position of

sprite zero.

C01A: LDY D010 ; Load the Y register with the MSB of all sprites.

C01D: CPY #\$01 ; Compare the Y register with the value (#) one, to test to see if sprite one is in the right hand portion of the screen. This is rather inflexible, as it assumes that only one sprite is in use, and that all other sprites are in the left section of the screen. However, we haven't covered the appropriate instructions enough for use.

C01F: BEQ C02B ; If the sprite is on the right hand side of the screen, Branch to \$C02B.

C021: DEX ; Since we're moving the sprite left, we must DEcrement the X register, because it contains the sprite's X position.

C022: CPX #\$18 ; Compare the X register with the value \$18. This makes sure that the sprite doesn't disappear under the left border.

C024: BNE C027 ; If it's not \$18, Branch to \$C027.

C026: INX ; It is \$18, so we INcrement the X register, ready for SToring, to make sure the sprite doesn't disappear under the border.

C027: STX D000 ; Store the X register back in the location for sprite zero's X position.

C02A: RTS ; Return from Subroutine, all done.

C02B: DEX ; This is where we come if the sprite is in the right portion of the screen. The DEcrement X moves the sprite one to the left.

C02C: BNE C027 ; A Branch if Not Equal instruction without a CoMPare will automatically compare the register in question, in this case the X register, to zero. This instruction tests if the sprite has moved into the left portion of the screen. If not, Branch to \$C027.

C02E: DEX ; If the X register was zero, we have to make it \$FF, and the easiest way to do this is to DEcrement it one more time.

C02F: DEY ; Y holds the MSB info, so we need to DEcrement Y to put the sprite on the left hand side of the screen.

C030: STX D000 ; Store the X register in the sprite 0 X location.

C033: STY D010 ; Store the Y register in the MSB location of all sprites. Please note that nothing will happen to

the sprite until the two above STores have been executed.

C036: RTS ; ReTurn from Subroutine.

C037: LDX D000 ; Okay, now we'll move the sprite right. Load X with the X position location for sprite 0.

C03A: LDY D010 ; Load Y with the MSB location.

C03D: CPY #01 ; If it's one, ie the sprite is on the right of the screen, C03F: BEQ C053 ; Branch to \$C053.

C041: INX ; If its not, INcrement the X register, to move the sprite right.

C042: CPX #FF ; ComPare the X register with the value \$FF, or, is it at the border of the two regions on the screen, on the left hand side.

C044: BEQ C04A ; Branch if EQual to \$C04A.

C046: STX D000 ; Nope, its still in the left region, so we can STore the X register in the location for X positioning of sprite 0.

C049: RTS ; And ReTurn from Subroutine.

C04A: INY ; The sprite needs to cross the border into the right region, so we INcrement the Y register, which holds the MSB, to put the sprite into the right region.

C04B: INX ; INcrement the X register, which holds the X position of the sprite. Since this is \$FF, it will become zero.

C04C: STX D000 ; And STore the X register in the sprite 0 X location, \$D000.

C04F: STY D010 ; STore the Y regis-

ter in the Most Significant Bit location.

C052: RTS ; Finish the routine. ReTurn from Subroutine.

C053: INX ; INcrement the X register, which will move the sprite one to the right when we STore X.

C054: CPX #41 ; ComPare X with the value \$41. This makes sure the sprite doesn't go under the border.

C056: BNE C04C ; If it hasn't gone under, \$C04C.

C058: DEX ; DEcrement the X register.

C059: CLC ; Clear the Carry flag.

C05A: BCC C04C ; Branch on Carry Clear to \$C04C.

C05C: LDX D001 ; This is the beginning of the up routine. First we must Load X with the sprite 0 Y location.

C05F: DEX ; And DEcrement the X register, to move the sprite up one when we STore the X register.

C060: CPX #32 ; ComPare X with the value \$32, to see if it's gone under the top border,

C062: BNE C065 ; If not, Branch to \$C065.

C064: INX ; If so, INcrement X,

C065: STX D001 ; And STore X to move the sprite.

C068: RTS ; Back to caller. The caller is the routine which Jumped to SubRoutine to this program.

C069: LDX D001 ; Finally, Down. Load X with the Y location,

C06C: INX ; INcrement it, to move the

sprite down one,

C06D: CPX #E7 ; See if its under the border,

C06F: BNE C072 ; If not, \$C072.

C071: DEX ; If so, DEcrement X to compensate,

C072: STX D001 ; STore the X register,

C075: RTS ; And end.

That is the working part of the routine over. The next is an optional routine to drive the above sprite mover through interrupts.

C076: JSR C000 ; Jump to SubRoutine to \$C000 to check if the joystick has been moved,

C079: JMP EA31 ; And JuMP to \$EA31, the operating system's interrupt routines .

C080: SEI ; This is the setup routine for using interrupts. Disable interrupt s.

C081: LDA #76 ; Set the interrupt pointer

C083: STA 0314 ; to \$C076,

C086: LDA #C0 ; The above two-line routine.

C088: STA 0315

C08B: CLI ; Reenable interrupts,

C08C: RTS ; End. Back to BASIC.

That's all for this month, hope you understand things a bit better. Next month, we'll take a look at the 65XX's flags, and the stack. □

Pro Golf

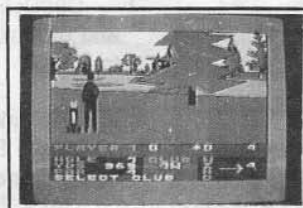
WE'RE ON the fairway now and graphically it's pretty hazy, but IBM does that to you, ay. Yet we're still having fun . . . I like the game. I mean, if you're not looking to get sponsored by Acubra to cushion your head in outback leather, then golf can be enjoyable at any time, even in the rain, even if you're bad.

And even if the computer game is not the best, I guarantee you'll get a blast of humoured entertainment from messing around with the keys and taking slug or two down that ol' strip o' green.

With *Pro-Golf* you're hav-

ing that fun, though *Pro* might be a tad stretch more than the stomach of imagination can handle. It does indeed look tame and the dude-ette that's supposed to be you is a stiff preppie version of Dean Martin sobered.

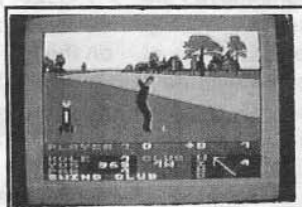
The putts, the swings . . . taking quite a while to grease over and look at-all lively, look active and useful. Graphically we're looking at the kind of pictures you get on Christmas wrappings.



There ain't no sound, and the music is what you get in a trapped elevator during a blackout . . . right, nothing.

But - it's there - the sport of a balmy weekday afternoon. Because

playing the game is just that kind of feeling, it'll feel better playing it on a weekday when you should be working cos then anything is better than pushing a pencil and *Pro-Golf* will even look challenging if you're sipping an undeserved Lager. □



Adventurer's Realm

by Michael Spiteri

WELCOME TO another Realm. Sorry for the very reduced size, but I got all the months mixed up and forgot all about the November issue. I will make it up to you in the next issue! (*See, it's not my fault -Ed.*)

The Realm Help Booth

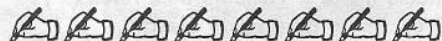
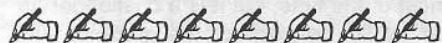
If this issue gets to you before the 21st November, then quickly prepare all your problems and rush to the grand opening of the Realm Help Booth at Melbourne's Toyworld in Swanston Street. Starts 10.00 and ends at about 12.00. If however, Saturday the 21st has passed then you can still use the Help Booth. It is operational during shop hours. Remember, whether or not other states get a Help Booth depends on Victorians using the facility. The Help Booth offers the following:

- ★ A computer database containing hints to many adventures.
- ★ A free mail service. Just post your problem in the Booth's mail box and it will reach me by the end of the week. You don't even have to enclose a stamp!
- ★ Free Realm Hint sheets.

Hottest news this Month

The hottest news this month has to be that concerning the new new new Infocom games. The fourth part in the Zork series is soon to be released. Entitled *Beyond Zork*, it will be Infocom's first serious attempt at a role-playing adventure. You can create your own character to take you around the Zork Universe. More info when we get some!

But wait, there is more! *Plundered Hearts* is the name of Infocom's first romance. Written by Amy Briggs, it is set in the 17th Century. Then we have *Nord & bert couldn't make heads or tail of it*. Eight adventure games in one. Along with the two very recent releases of *Lurking Horror* (containing sound effects in some versions) and *Planetfall* sequel *Stationfall*. I can't see any reduction of problem letters sweeping into the realm!!



Writing to the Realm

Enclose a stamp if you want a reply. I now promise to reply to all mail requesting help. If I don't know the answer to the problem, I will try and suggest a few methods of solving the problem. The current address to write to is . . .

Adventurer's Realm
1/10 Rhoden Court
North Dandenong,
Victoria, 3175

I read many letters concerning adventure games. Please put your name at the bottom, whether it's Bilbo or Zorro, and please please print a return address (Calling Mark Glendenning, could I have your address?)



Zorker of the Month

Tony Newman writes: "I find it very teasing that you publish a Zorker of the Month but don't mention their questions!! How about equal rights for Zorkers!!"

MS: Another silly letter from a Zorker. Although I despise Zorkers, I DO reply to their queries. There isn't enough room to print all their problems. And what would be the point of such a thing!!
EQUAL RIGHTS FOR ZORKERS?? That statement alone is enough to make Tony Newman of Penhurst, NSW, ZORKER OF THE MONTH.

Congratulations Tony!!!

(For any other Zorkers out there, the realm has made specialised hint-sheets for Zork I, II and III. You can pick these up at the Help Booth or if you live beyond Melbourne limits, write to the Realm.)

Chit-Chat

Adventurer of the Month

OK Hordak. You win.
Happy now??

Vivienne Slater is no longer alone in her quest to reduce Nine Princes of Amber to nothing!! Mark Glendenning writes "The game is slow and plays by itself most of the time, but it is a challenge! As far as I'm concerned, the graphics and music make it Trilliums best release yet! (Yes, better than Perry Mason).

MS: I wouldn't go as far as calling it better than Perry, but I agree that the graphics and sound are impressive.

Meanwhile, Hordak (alias Mark Hordak) is trying hardest to become Adventurer of the Month by supplying the Realm with lots of tips. He also sends some suggestions in for the Realm . . .

"Why don't you have a cassette Top 10? Also, I agree with Simon Newton,

have a national challenge. The prize could be an Amiga 500 with every adventure available on it."

MS: An Amiga 500?? Why don't you ask for a Porsche, or a new house. Hassle the editor for such a big prize!! As for the tape top 10, some of the games featured in the Australian Top 10 are tape base games.

Bin Fong Chiang of Gwynneville, NSW, writes:

"After one year playing *The Pawn*, I have finished it. However, like Vivienne Slater said in the September ACR, the ending of *The Pawn* is unsatisfactory. Still, the game is interesting and enjoyable, and it is the first adventure I have played, so I really cannot tell how good it

is compared to Infocom games."

Then finally to Wolfe the Enchanter's bit about the Realm....

"I loved the Royal Puzzle. It was one of the trickiest parts of the game but really not a maze as such. The adventure price/difficulty list seems like a good idea, as does "Someone write an adventure and everyone have a go at it". And to those computer stores that refuse to stock Infocom - Stick your shop up %&%&%&' ((**MS:** Deleted for the protection of minors)"

MS: So it seems everyone wants a competition. Hmmm, lets see what Mr Farrell says about the idea. It might be a goer!!



Problems Solved



From: Steven Suthers

For: Simon Newton & Brady Wallis

Game: *Seabase Delta*

Help: To get the egg from the hen, get the bubble gum from the deep freeze then chew the gum and blow a bubble to wake up the hen!!

From: Steven Suthers & Hordak

For: Andrew Sopar

Game: *Holy Grail*

Help: Get the shrubbery from the store-room in Camelot and take it to the . . . "Knight who says 'nic'". Type "GIVE SHRUBBERY". You cannot get rid of the three-headed knight, just don't take your wedge near him!!

From: Alf Glass

For: Alex Harvey

Game: *Lord of the Rings*

Help: A cup of liquid from the condo dispensing machine will revive the woman. At the top of the spaceship (ie. outside) you will need the spacesuit (leotard) from the main control section, and the helmet from the robot in the rubbish pile. You

have to repair the robot first. The colour codes, standard IEEE, are listed in their numerical order on the control panel in the mortuary. The bracelet will tell you the colour code of the area you are in.

From: Mark Glendenning

For: Colin Walker

Game: *Dragonworld*

Help: To escape from the mirror type "break mirrors with starsword" This will leave you with one warrior. To dispose of him, "ASK HAWKWIND"

From: Hordak

For: Andrew Sopar

Game: *ZZZzzz*

Help: Examine mansion. Climb Vine. Climb down. Take what you've knocked off. Go to the Phone Box, wear the tie, enter box . . .

Problems to be solved

Bin Fong Chiang is stuck in *Knights Orc*.

In part one, how do you get through the thorn hedge. In part two, where is the

recruiter, how can you read the writing on the plaque & driftwood, how can you get the rope on the bridge and how can you get the disk on the anthill? He is also stuck in Arazok's Tomb. . . "Can you help me get through the giant snake and how to open the east and west doors?"

Steven Suthers likes to get stuck in many games at one time.

Seabase Delta: What does he need to stop drowning?

Where is the ink? How does he build a ladder to get to the missile? How does he get to the table in the food farm?

Red Moon: How does he swim without running out of breath?

Holy Grail: What does he do with the %&%&% grail?

What does he do about the sorcerer? Next to Hordak . . .

Dracula Pt 2: Once I've got the lamp, how do I get out of the labyrinth?

Lord of Rings: When I go east from Merrys house "It's too dark to do anything!" What do I do?

Next Month

A bumper Realm with many, many, many hints & tips!!!

Arcade Action

by Darren Brown

Well, after a break for a month, I am back. The break in Arcade Action was due to a major word processor and printer problem, but that is all fixed now. Unfortunately, all you C64 buffs might be a bit disappointed by the lack of software, but that really can't be helped. Luckily enough for the Amiga buffs, I have plenty of reviews for you, and I only hope that I have enough room in the mag!

FOLLOWING THE continual trend of our editor, Andrew told me to send a photo of myself up with this issue, I am still considering it, and after speaking to Andrew for quite a while (STD!!) he told me that he always wears sunnies because he doesn't want to be recognised in public. So I said to him, with a face like yours, it's no wonder!! Sorry Andrew!! Anyway, so when I eventually send a photo, it might have me wearing sunnies to follow the trend of our beloved editor.

Now, after all that is said and done, it's time for the reviews. "Finally!" I hear you say!! Well, I will start off with the C64 ones.

Centurions

PowerXtreme! No, There's never a dull moment when you're a centurion. There you are unwinding in the Skybolt Relaxation Centre, recuperating from your last mission with a spot of four-dimensional chess when the emergency warning sounds. It turns out that the evil Doc Terror has broken into the Weapons Development Centre and is even now searching through its rooms for a fearsome and untested new nuclear compound, Tyron-Dichromate. And if he gets hold of it? Well, it's the end of civilization as we know it, of course! Nothing else to do but summon your trusty weapon-studded exoskeletons and beam down to the W.D.C. to foil the dastardly Doc and his myriad alien henchmen. There is a bit of good game play, but nothing too spectacular. Coming soon.

Deathwish III

"Go, ahead, Make my day!" No!

Wrong person. Yes, if it isn't Dirty Harry, there is only one other 'shoot-first-ask-questions-later' person from the big screen, yes it is. New York's most famous death-bringer, the revenge-bent hero of the Deathwish movies, played by 'he-who-cannot-smile' himself, Charles Bronson. In Gremlin's *Deathwish III*, due out soon, you play Paul Kersey and your mission is, armed (only) with a Heckler & Koch shotgun, Uzi 9mm and a rocket launcher, oh, not to forget his little friend, Magnum, to clear the streets of any creeps and dirtballs who may be lurking out there, ready to prey upon the innocent citizens of The Big Apple.

T.A.N.K.

Is it an earthquake? Is it the end of the world (again!)? No, no, of course not, it's just the distant rumbling of an approaching T.A.N.K. Well, Ocean have done it again. They have just brought out another shoot-em-up! Will they ever learn? Probably not, as most of you readers like killing and destruction. You guide your caterpillared fighting machine through jungles, ruins, swamps and deserts, taking on infantry, land mines and other tanks. Basically, all you do is shoot everything that moves, only pausing briefly to pick up the letters scattered about the place which give you increased range, energy and firepower. Fun for all the family! (Not really, just the computer buffs).

Well, that ends the C64 scene for another month. Don't worry, I hope to have more next month though. Now, what all the Amiga readers have been waiting for, the Amiga Arcade Action.

Space Port

For any of you readers that have had a C64 before they acquired an Amiga, you may have at one time or another, played a game called *Fort Apocalypse*. If not, I will fill you other readers in on the details. You are a helicopter that has to rescue men off platforms in the most awkward positions for the chopper to get into. It has the same principle as *Choplifter*, but you never have to drop the men off somewhere. There are lasers, raising and lowering platforms, guided missiles, other helicopters and lots of jutting edges to prevent you from collecting your men and reaching your goal. Plenty of shooting but, also plenty of joystick skill required.

Typhoon

Here is another shoot-em-up from Kingsoft, the makers of *Phalanx* and *Cruiser Factory*. It is a top scrolling shoot-em-up with multi-loading backgrounds. Plenty of action. The digitised sound adds to the quality of the game. While you are fighting the elusive aliens, you sometimes come across an energy pack which increases your bullet range, bullet size, or a shield. Not much to review on this one, as I have said all there is to be said. Graphics are very well drawn, and plenty of sound.

Garrison

You all have been waiting for it, I have too, it's just that I get it before the rest of you. It's a game people have spent many a dollar on in the Arcades, so I am sure you won't mind spending a bit more for this one. *Gauntlet*. One word should review the whole game! When you have loaded you are presented with a choice of five characters, Merlin the Wizard, Agor the Warrior, Golwyn the Elf, Valeria the Valkyrie and Thorin the Dwarf. You

choose your character and go into the game.

The play area takes up two-thirds of the screen, with the other third to give you the details of each character's score, health, keys/treasure/potions collected. At the bottom of the screen is a clock which doesn't quite work as I assume the version I have is a pre-release, but speed in the game would be essential. There are zillions of ghosts trying to nobble you, and you lose health points if they touch you. You can destroy the ghosts by zapping them, but make sure you have plenty of room as when they start crowding, you will start dying very quickly indeed!

Other features of the game include chunky hunks of chicken and swinish looking hams to keep your health up, drinking potions and amulets for special powers and teleports to get you into the corners of each level.

The play is smooth and the action

does not slow down regardless of how many nasties are on the screen!

I can't wait until the author finishes this alternative to *Gauntlet*. He promises a hundred levels, lots more enemies, heaps more digitised sound (if there isn't enough of it already!) and even better graphics.

Well, that is about all I have room for this month.

See ya next time in Arcade Action. Bye!! □

The Editorial that wasn't!

DARREN BROWN of Doncaster called interstate recently to speak to the editor regarding this magazine's image. Without saying that he was directly critical of the editor, he did in fact have a few points of pertinent interest to us, the magazines producers.

Darren feels that the maturity level of our staff leaves something to be desired.

Perhaps a revamped editor's picture (without the Bolles) and a more upbeat editorial would be in line. In fact our entire direction needs a face lift. Darren further said that every photo in the magazine has sun-glasses in it. However I point out that we occasionally photograph disk drives without the top-on.

The explicit nature of this sort of pictorial has turned away many of our newer readers. Darren thinks we should go for a more avant garde approach to introducing people to the Commodore 64 and Amiga.

So, what do we do? By the time I got Darren's thoughts onto paper (bashed into my word-processor), he was out of twenties, and had to ring back. So, if you'd like to hear his ideas, be sure to read arcade action, or else he won't get paid, and he won't ring back. □

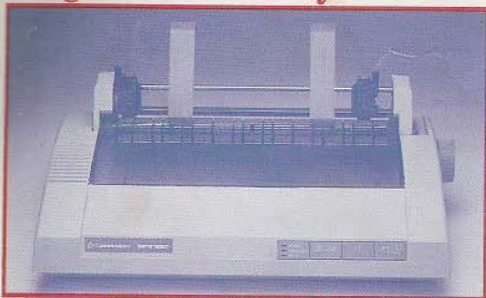
High Scores

Ace of Aces	12,600	J. STARLANDER	Lode Runner (cartridge)	level 31 466,675	C.WESTMAN
Alleykat	3,115,400	RUNSOFT	Miner 2049'ER (cartridge)	182,865	C.WESTMAN
Barry McGuigan's Boxing	195,000	RUNSOFT	Night Mission Pinball	7,870,000	RUNSOFT
Batalyx	8,685,940	RUNSOFT	1942	534,000	J.STARLANDER
BMX Simulator	3,225	RUNSOFT	Paradroid	27,375	
Bombjack	76,830	RUNSOFT	Parallax	58,040	RUNSOFT
Cauldron II	49,000	RUNSOFT	Raid over Moscow	293,000	RUNSOFT
Championship Wrestling	6,993	RUNSOFT	Rambo	3,948,300	RUNSOFT
Conan	79,920	RUNSOFT	Rockford's Riot	26,755	RUNSOFT
Crystal Castles	445,122	RUNSOFT	Rock'N Wrestle	489,300	RUNSOFT
Dan Dare	6,092	RUNSOFT	Short Circuit	34,095	RUNSOFT
Dragon's Lair	64,312	J.STARLANDER	Skate Rock	1,789,910	RUNSOFT
Eidolon	63,640	RUNSOFT	Schooldaze	126,190	RUNSOFT
Fist II	253,000	RUNSOFT	Space Harrier	589,810	RUNSOFT
Floyd the Droid	11,830	RUNSOFT	Super Cycle	306,060	RUNSOFT
Frankie Goes to Hollywood	78,300	RUNSOFT	10th Frame - Kids	224	RUNSOFT
Galivan	93,400	RUNSOFT	Amateur	161	RUNSOFT
Green Beret	883,500	J.STARLANDER	Pro	160	RUNSOFT
Hypersports	109,316	RUNSOFT	Terra Cresta	85,300	RUNSOFT
International Karate	113,800	RUNSOFT	Thrust	101,060	RUNSOFT
Jeep Command	303,990	RUNSOFT	Track and Field	874,930	RUNSOFT
Jumpman Intermediate	110,050	C.WESTMAN	Trailblazer	370,530	RUNSOFT
Jumpman Jnr. (cartridge)	3,761,450	C.WESTMAN	Uridium	117,130	RUNSOFT
Knight Games	66,485	RUNSOFT	Warhawk	968,575	RUNSOFT
Law of the West	7,694	RUNSOFT	Who Dares Wins II	124,690	RUNSOFT
Leader Board Golf Novice	23 under par	RUNSOFT	Yie Ar Kung Fu	21,678,650	RUNSOFT
Pro	11 under par	RUNSOFT	Z	128,600	RUNSOFT

COMMODORE PRINTERS

For every Commodore computer there is a Commodore printer that is designed to cover your specific needs whether you are an owner or user of a Commodore 64 or 128, an AMIGA 500, 1000 or 2000, a PC 5, 10, 20 or 40.

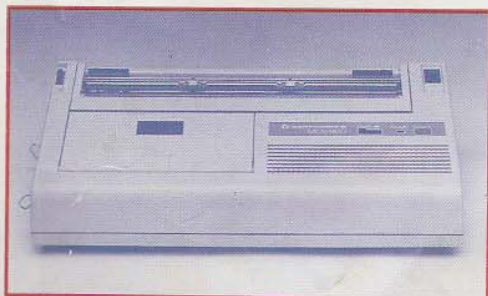
Commodore printers are designed to give you total compatibility with the rest of your computer system with built-in high performance and at the same time offering value for money.



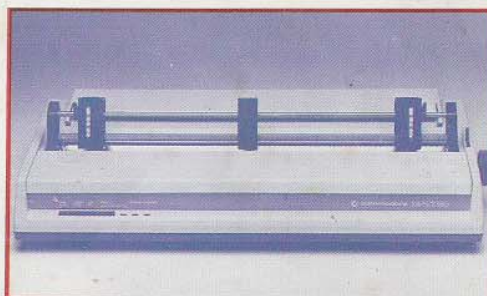
Commodore MPS 1250 Dot Matrix Printer



Commodore DPS 1101 Daisy Wheel



Commodore MCS 810/820 Colour Series



Commodore MPS 1280 Dot Matrix Printer



Commodore MPS 2020 Dot Matrix Printer



Commodore LP 806 Laser Printer

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COMPUTER

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